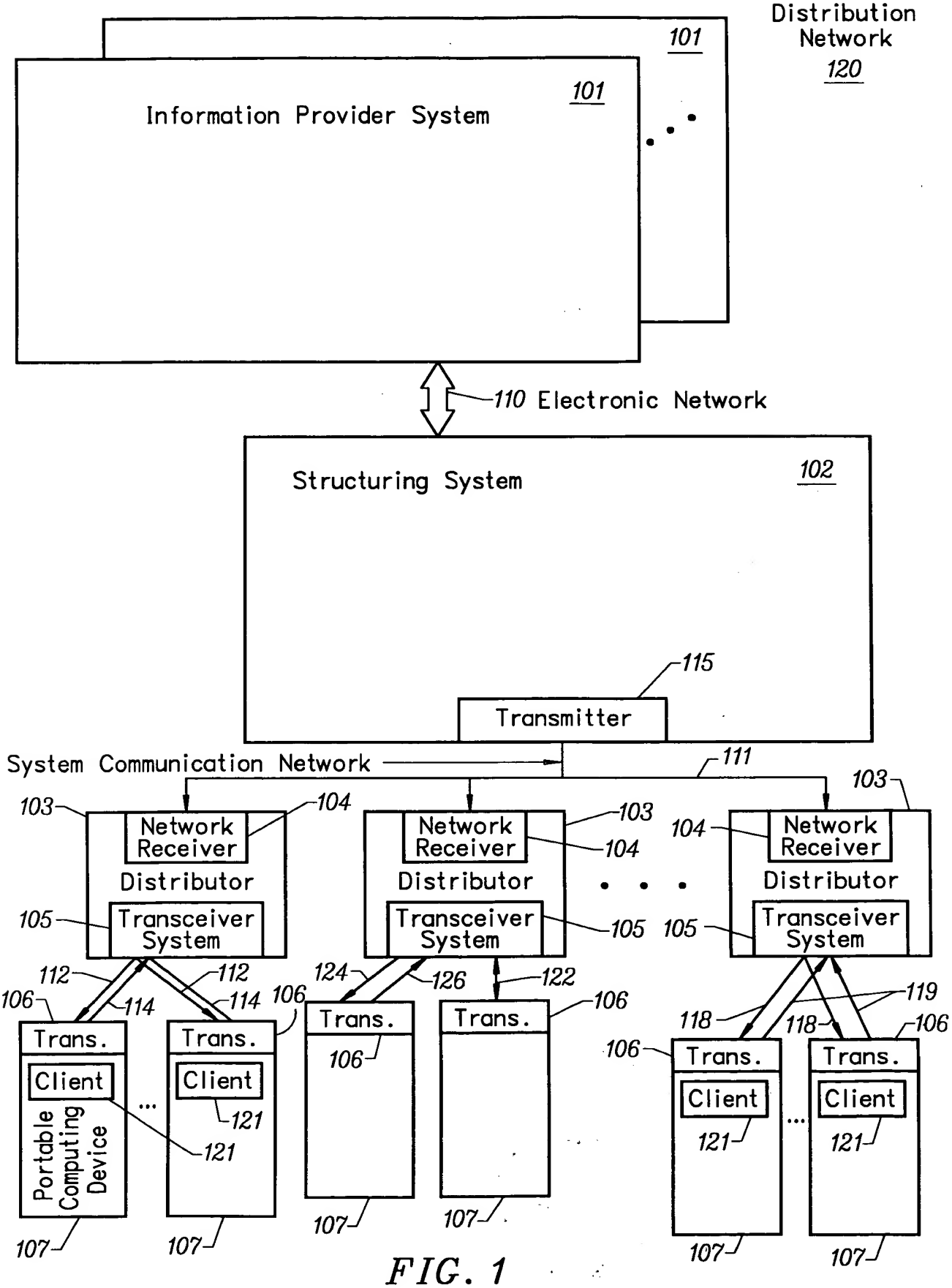
Distribution Network
120
101
101
Information Provider System
110 Electronic Network
Structuring System
102
115
Transmitter
System Communication Network
111
103
104
Network Receiver
Distributor
105
Transceiver System
112
114
106
Trans.
Client
121
Portable Computing Device
107
124
126
122
119
118

FIG. 1

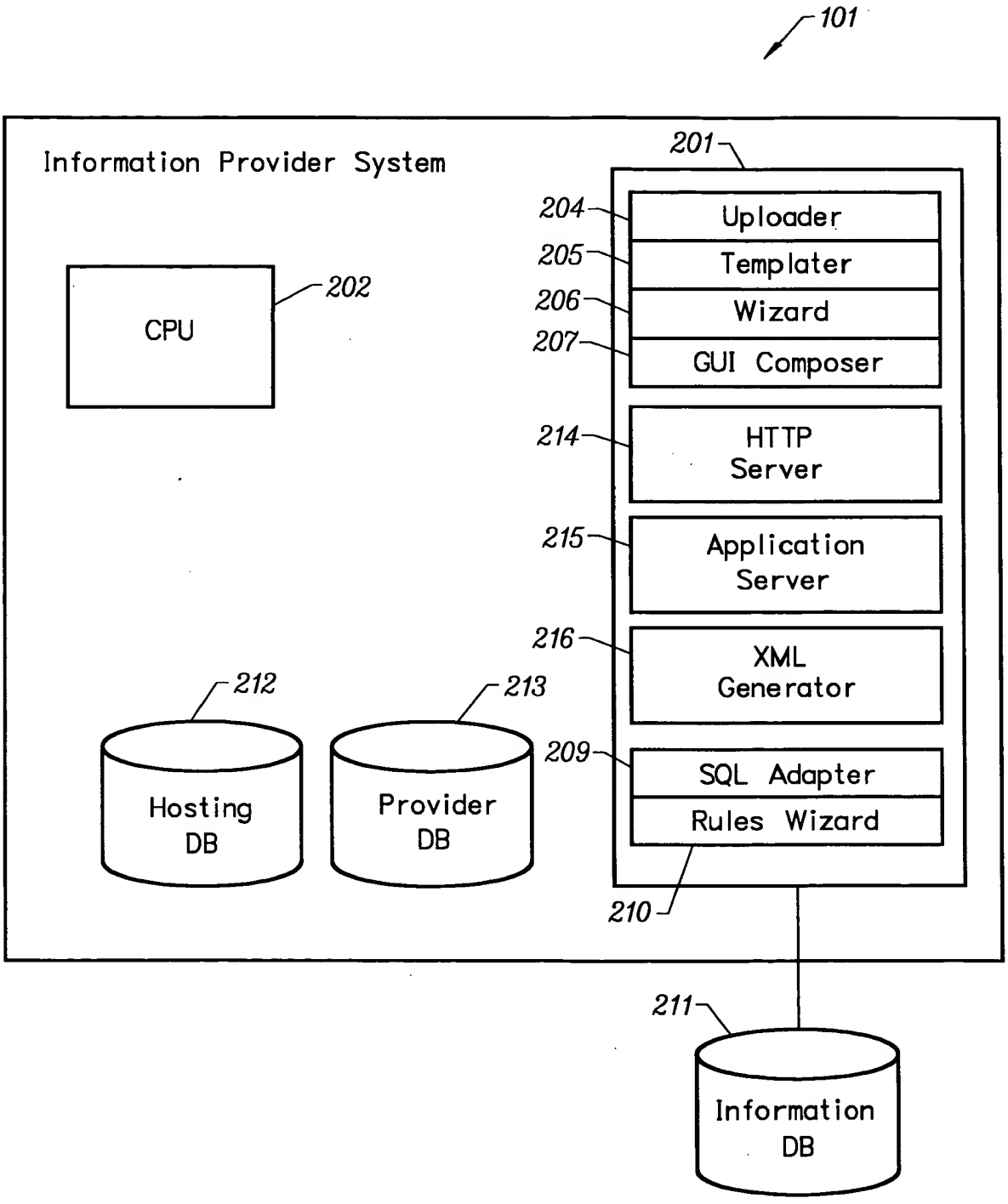
101
Information Provider System
201
204
Uploader
205
Templater
206
Wizard
207
GUI Composer
CPU
202
214
HTTP Server
215
Application Server
216
XML Generator
212
213
209
SQL Adapter
Rules Wizard
Hosting DB
Provider DB
210
211
Information DB

FIG. 2

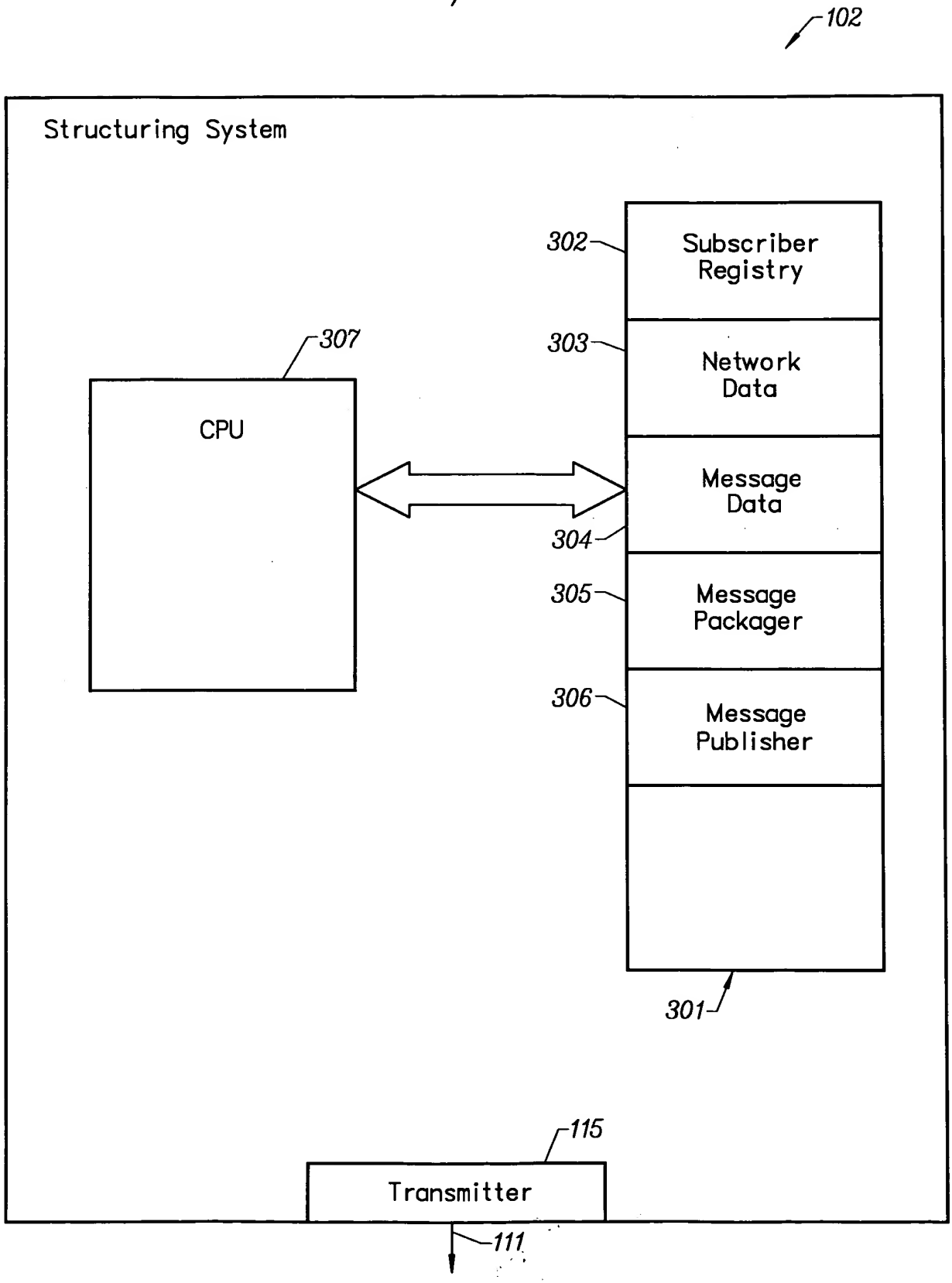
102
Structuring System
302
Subscriber Registry
303
Network Data
307
CPU
Message Data
304
305
Message Packager
306
Message Publisher
301
115
Transmitter
111

FIG. 3

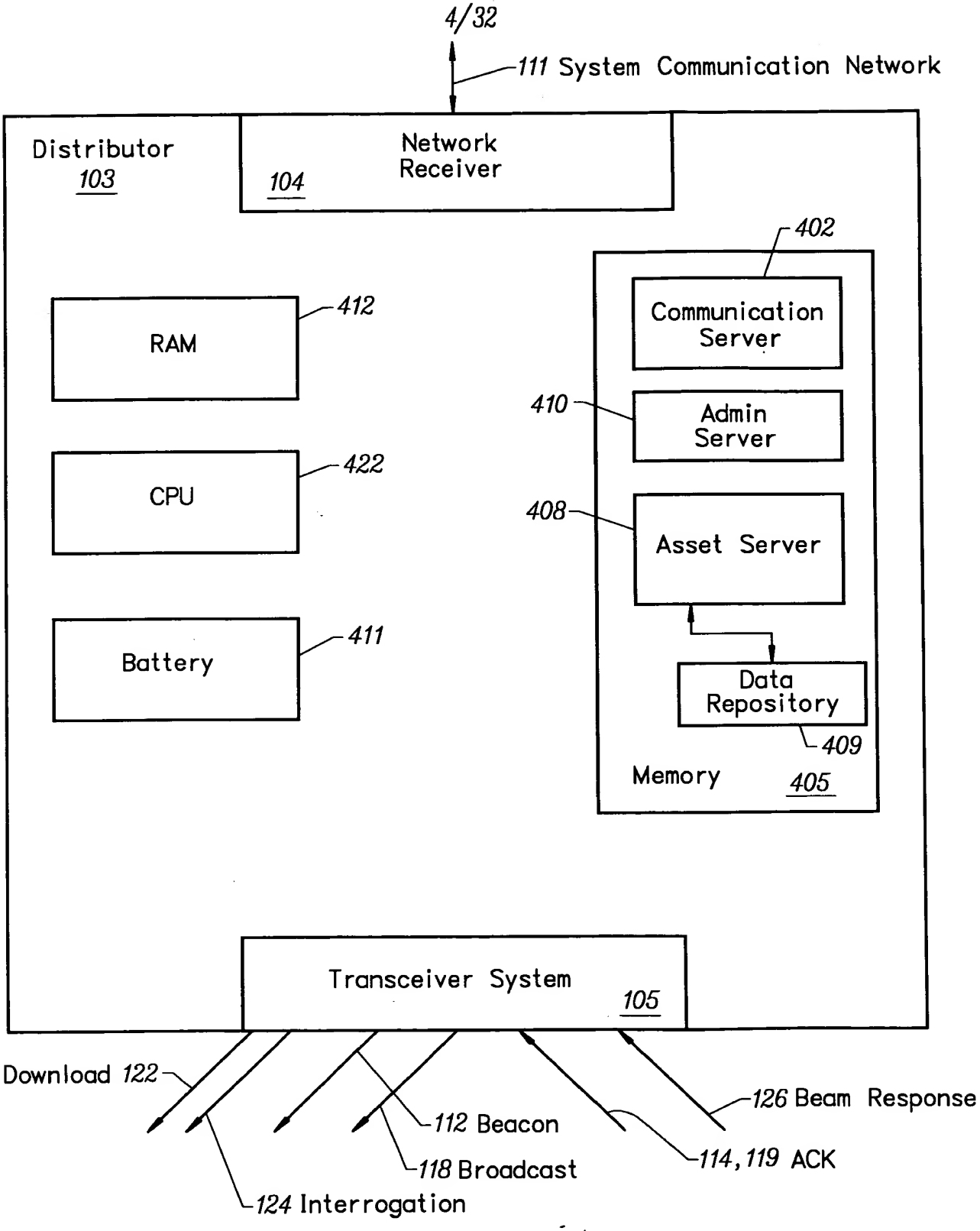
111 System Communication Network
Distributor
103
Network
Receiver
104
402
Communication
Server
410
Admin
Server
408
Asset Server
Data
Repository
409
Memory
405
412
RAM
422
CPU
411
Battery
Transceiver System
105
Download 122
112 Beacon
118 Broadcast
124 Interrogation
126 Beam Response
114, 119 ACK

FIG. 4

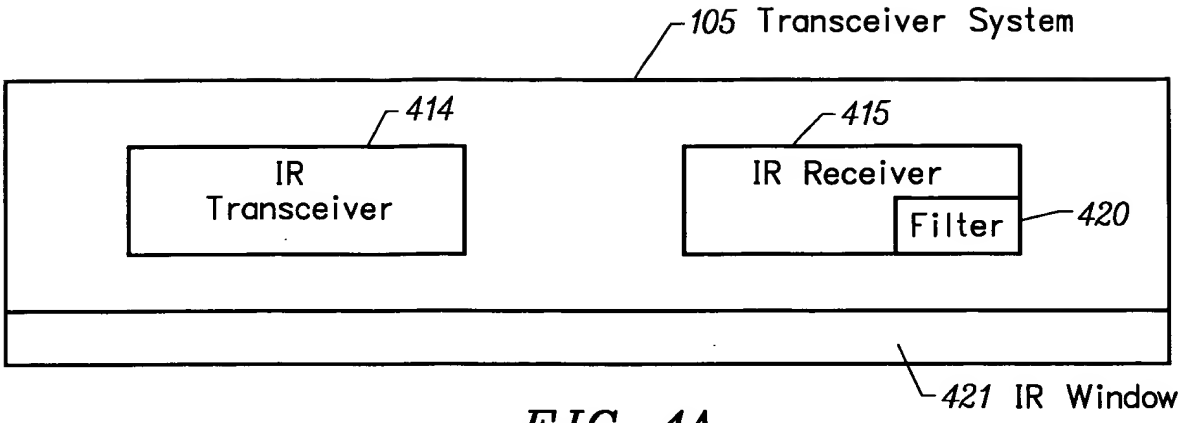
105 Transceiver System
414
IR
Transceiver
415
IR Receiver
Filter
420
421 IR Window

FIG. 4A

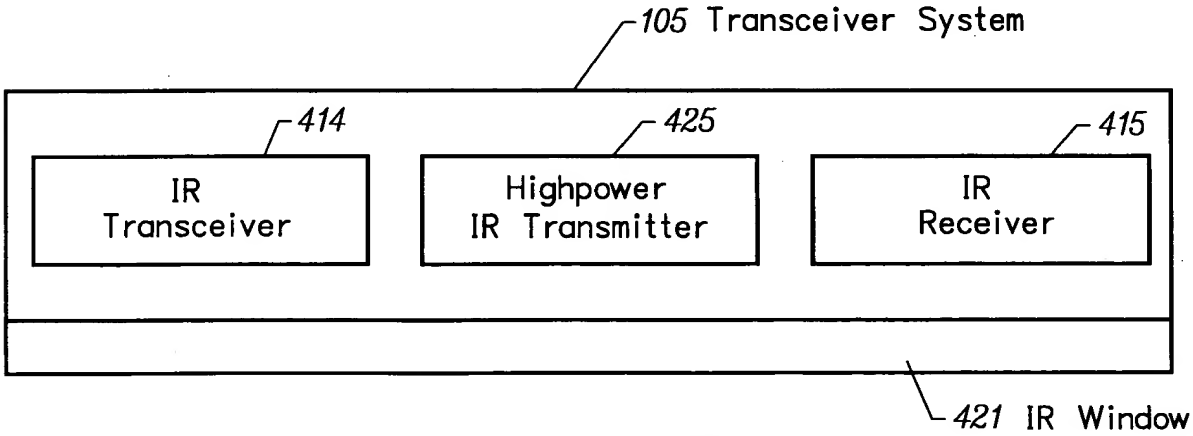
105 Transceiver System
414
IR
Transceiver
425
Highpower
IR Transmitter
415
IR
Receiver
421 IR Window

FIG. 4B

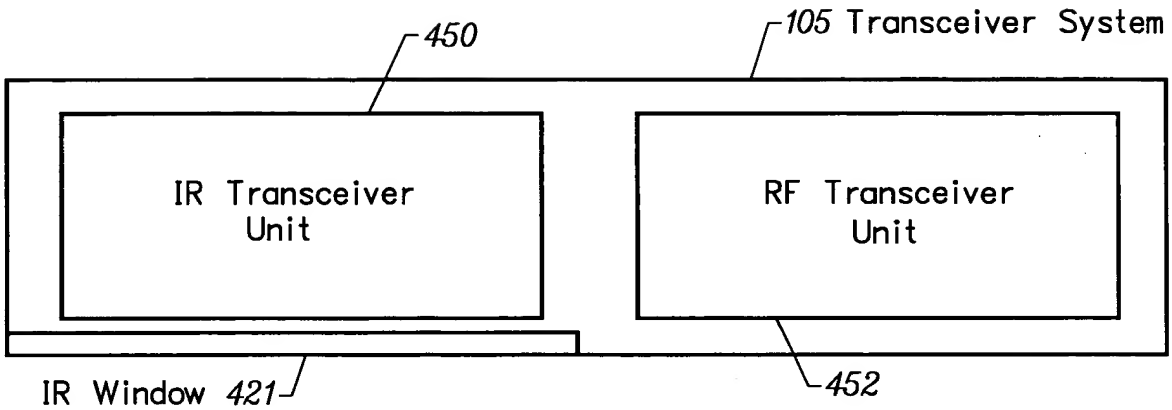

FIG. 4C

FOR2PCT-05/2004

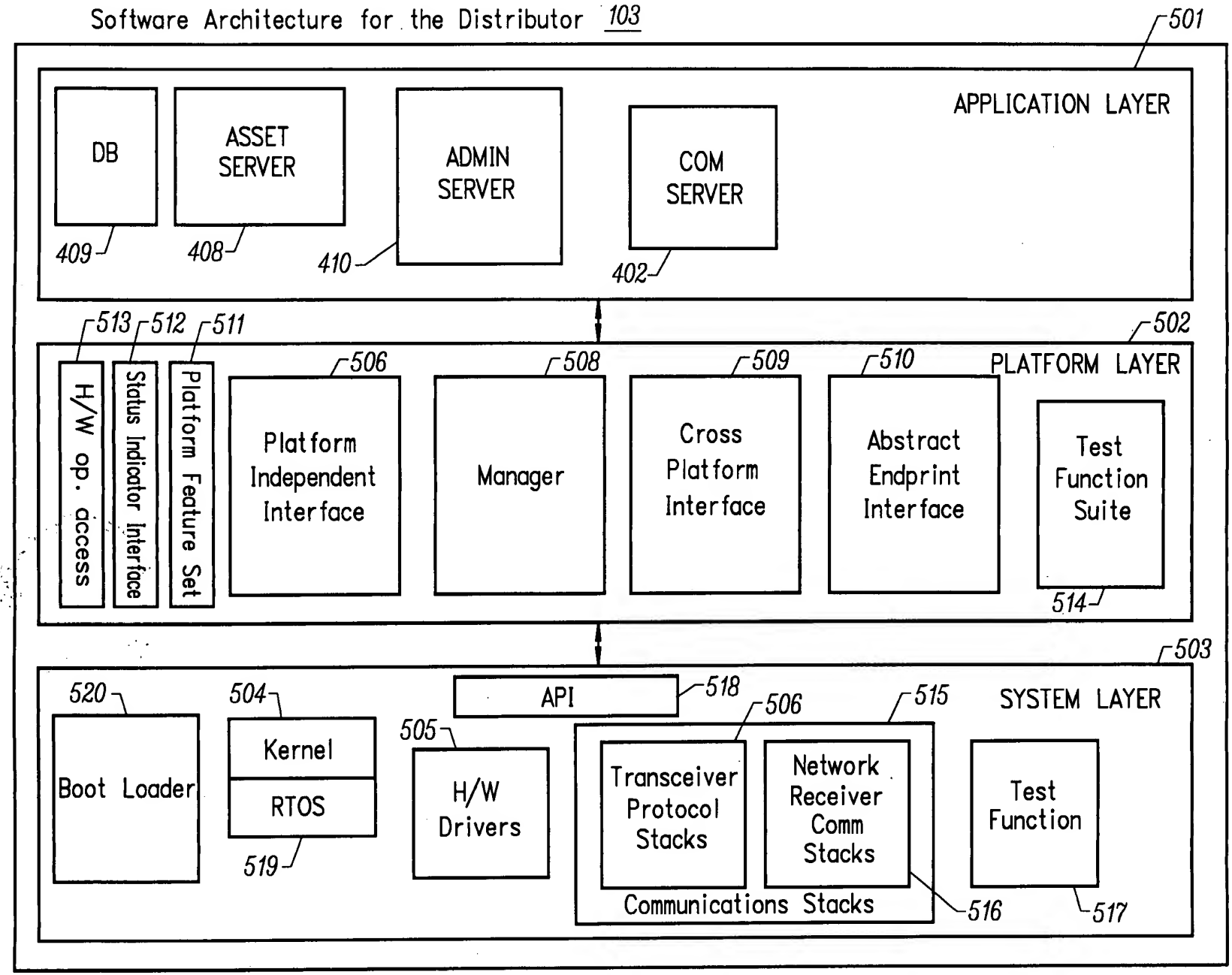
Software Architecture for the Distributor 103
501
APPLICATION LAYER
DB
409
ASSET SERVER
408
ADMIN SERVER
410
COM SERVER
402
513
512
511
502
PLATFORM LAYER
H/W op. access
Status Indicator Interface
Platform Feature Set
506
Platform Independent Interface
508
Manager
509
Cross Platform Interface
510
Abstract Endprint Interface
Test Function Suite
514
503
SYSTEM LAYER
520
Boot Loader
504
Kernel
RTOS
519
API
518
505
H/W Drivers
506
515
Transceiver Protocol Stacks
Network Receiver Comm Stacks
Communications Stacks
516
Test Function
517

FIG. 5

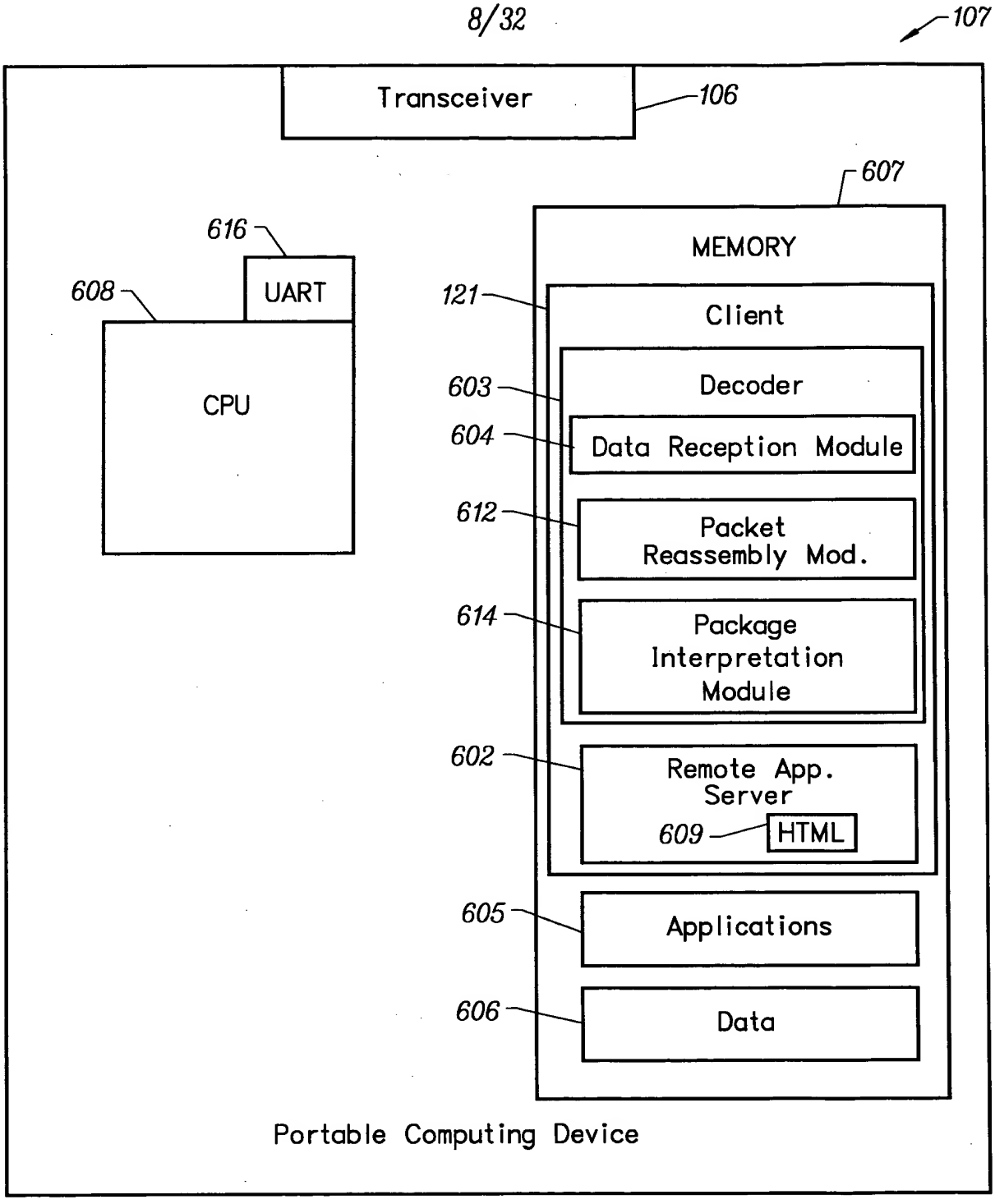
107
Transceiver
106
607
MEMORY
616
UART
608
CPU
121
Client
603
Decoder
604
Data Reception Module
612
Packet Reassembly Mod.
614
Package Interpretation Module
602
Remote App. Server
609
HTML
605
Applications
606
Data
Portable Computing Device

FIG. 6

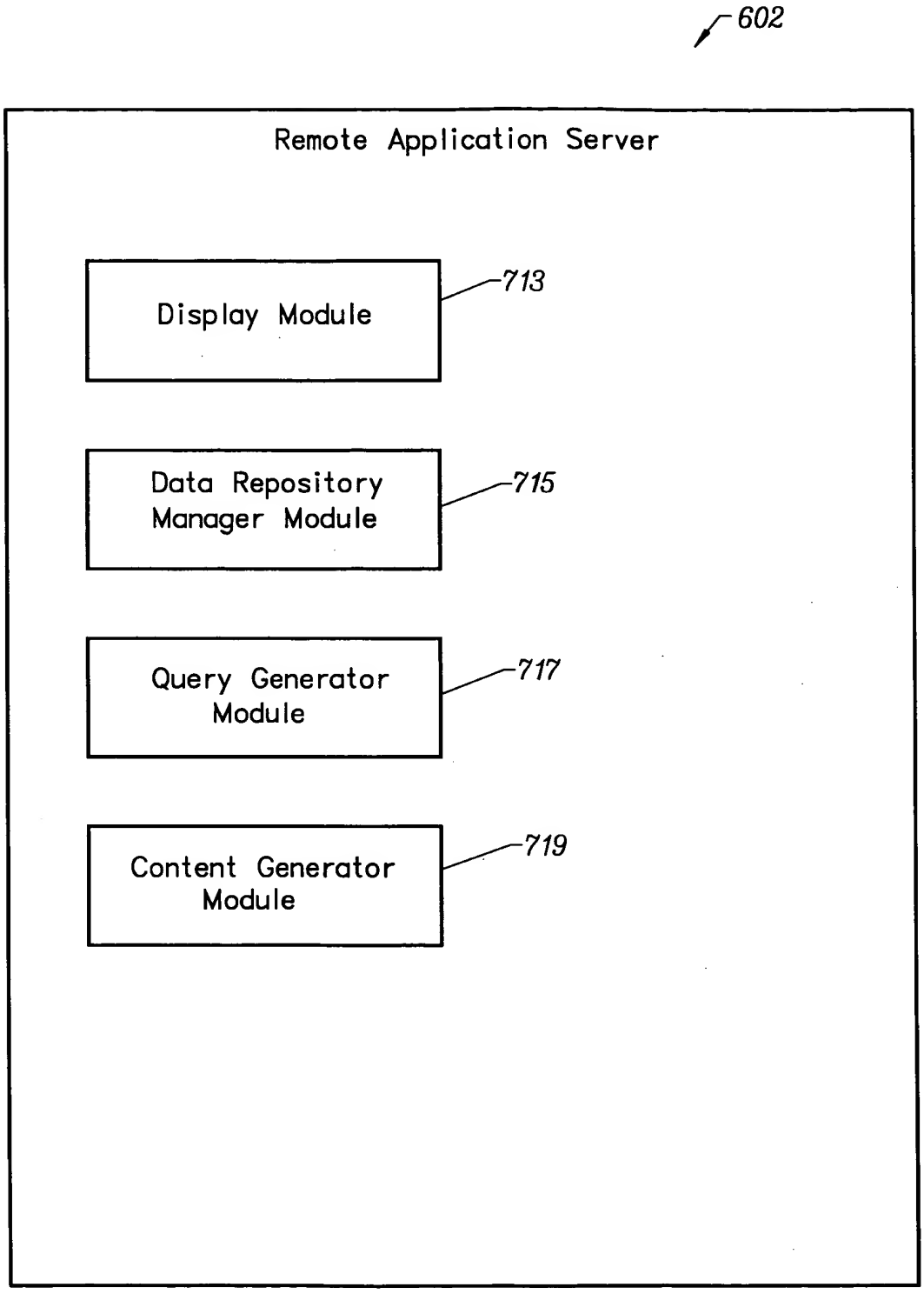
602
Remote Application Server
Display Module
713
Data Repository Manager Module
715
Query Generator Module
717
Content Generator Module
719

FIG. 7A

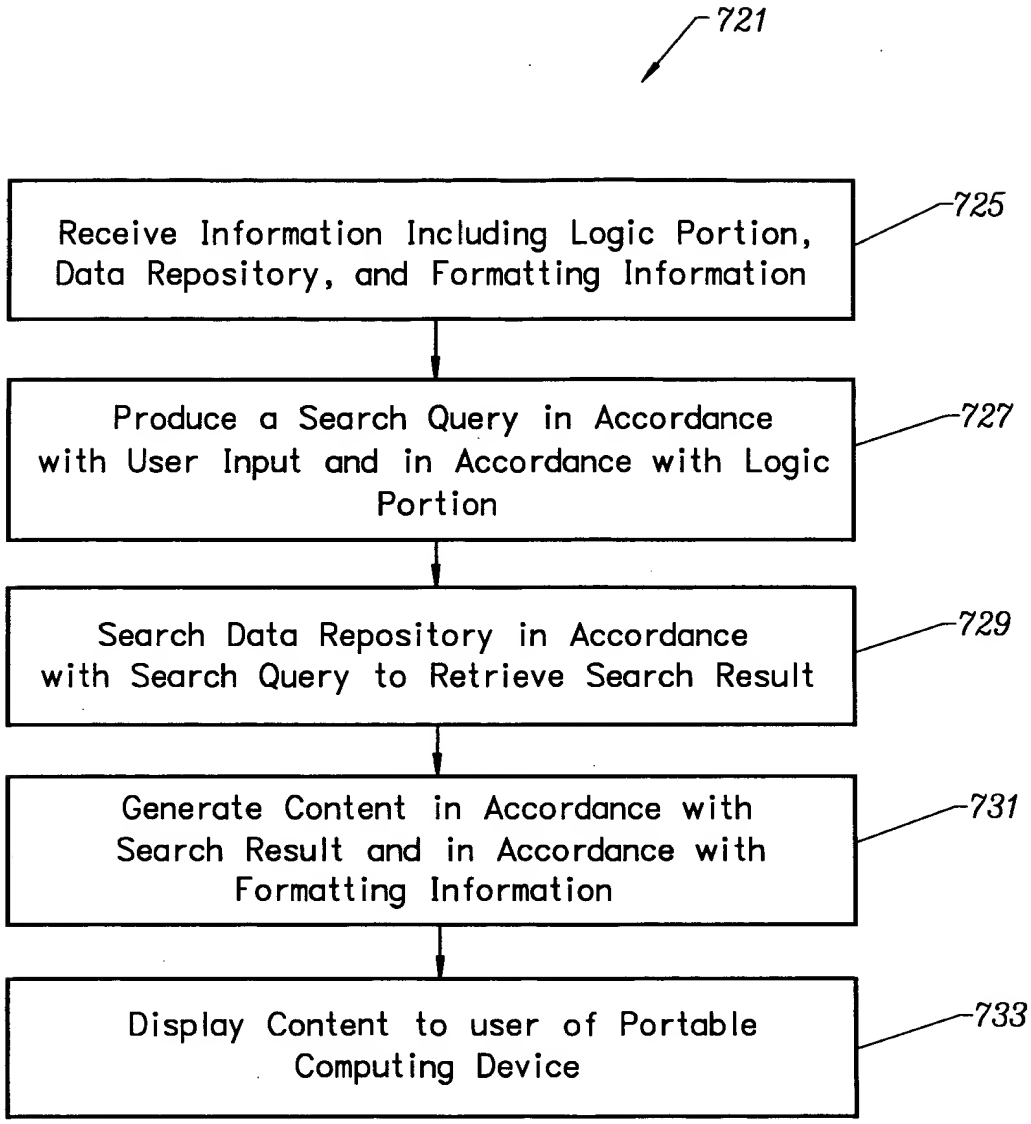

FIG. 7B

Docket: 5568.0200

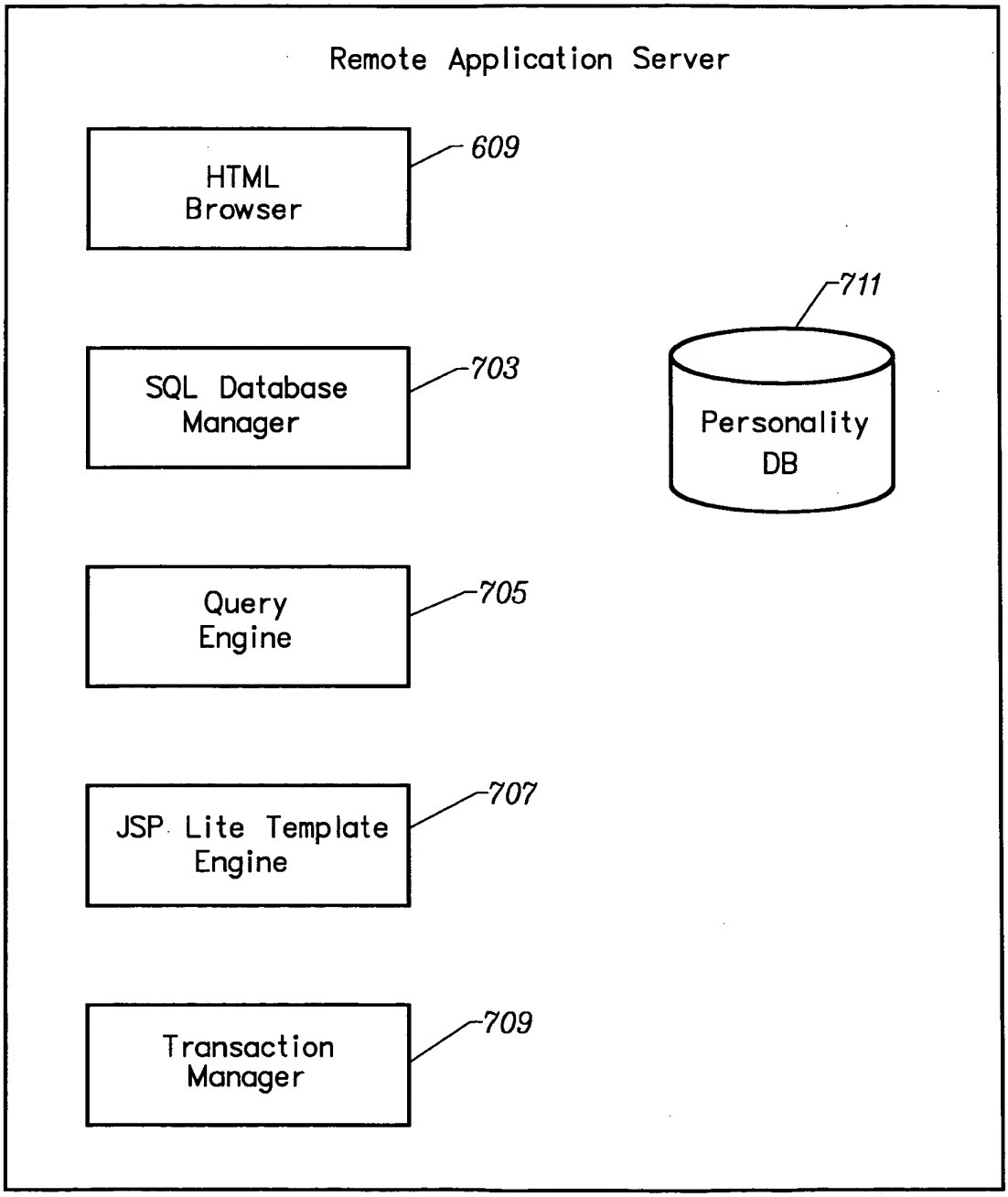
Remote Application Server
HTML Browser
609
SQL Database Manager
703
Query Engine
705
JSP Lite Template Engine
707
Transaction Manager
709
711
Personality DB

FIG. 7C

T00280 "6562h860

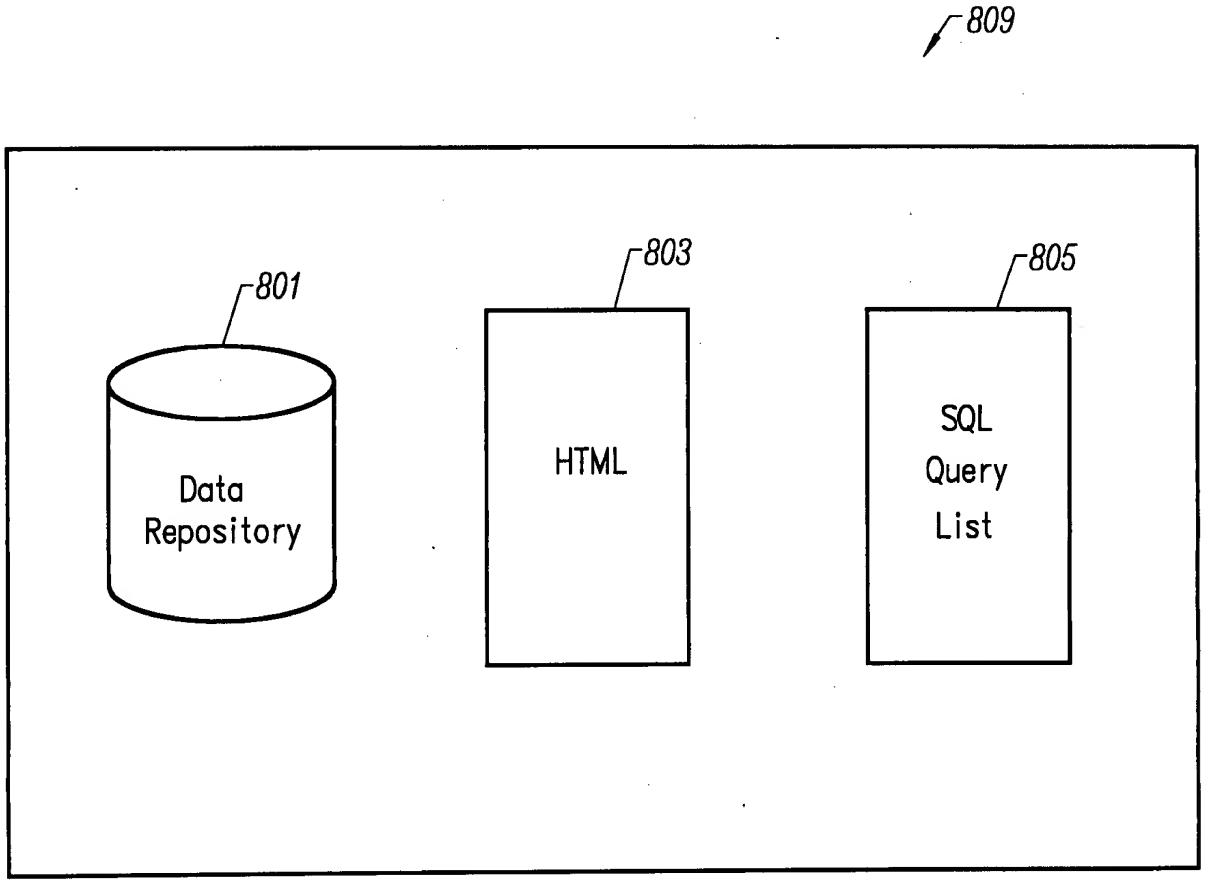

FIG. 8

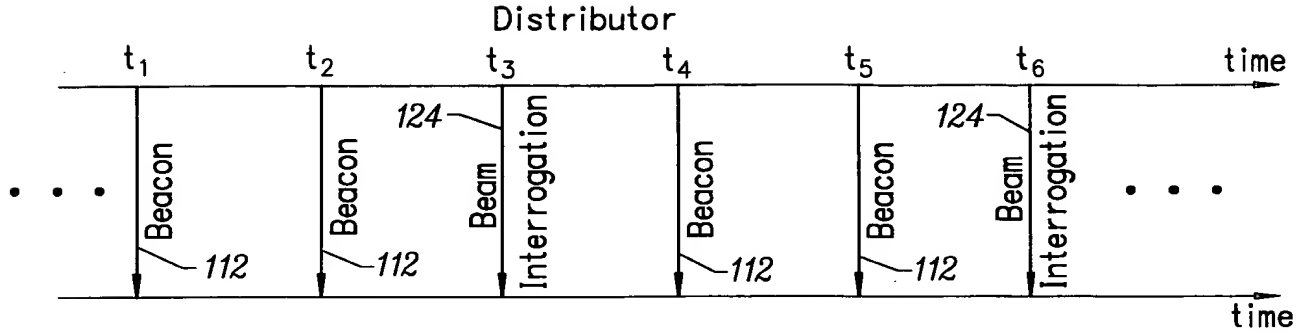
Distributor
t1
t2
t3
t4
t5
t6
time
Beacon
112
124
Beam
Interrogation
time

FIG. 9

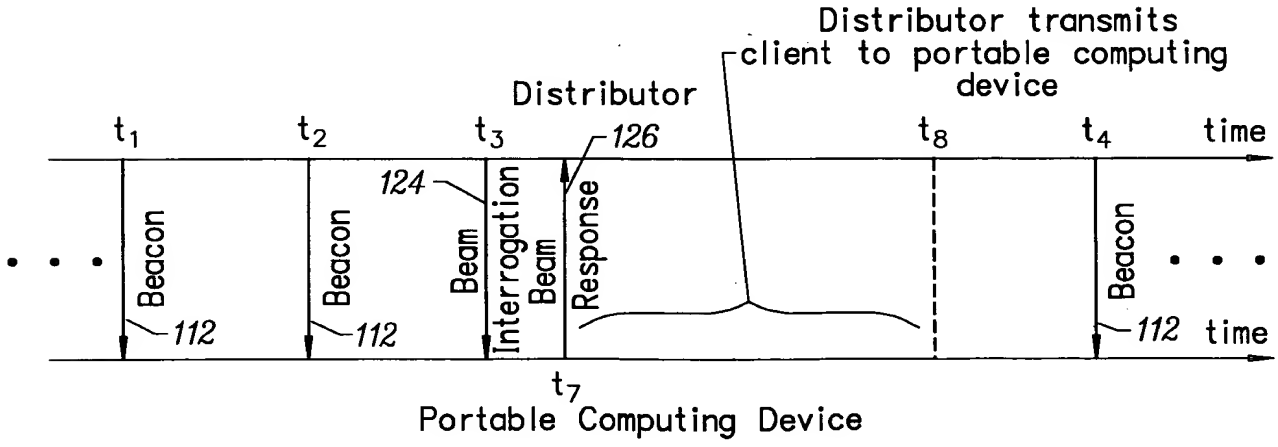
Distributor transmits client to portable computing device
Distributor
126
t1
t2
t3
t8
t4
time
Beacon
112
124
Beam
Interrogation
Beam
Response
t7
Portable Computing Device

FIG. 10

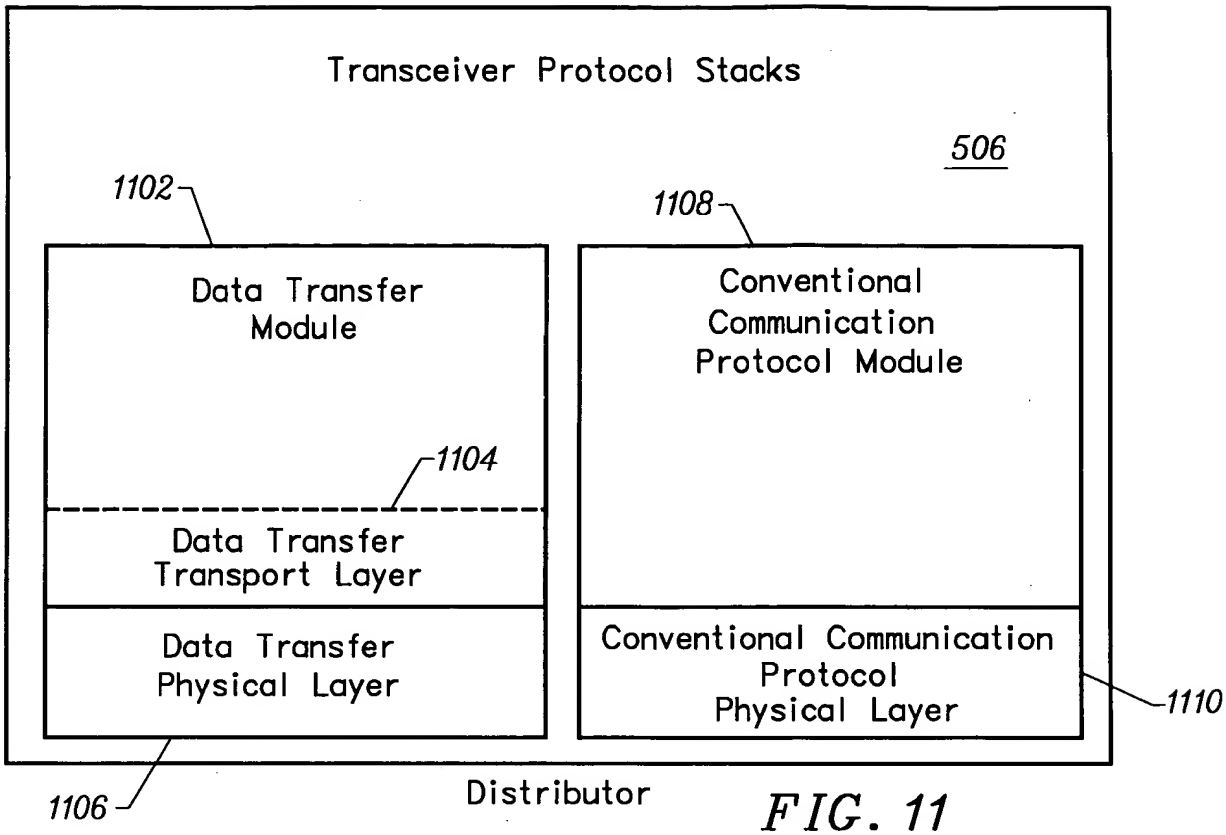
Transceiver Protocol Stacks
506
1102
1108
Data Transfer Module
Conventional Communication Protocol Module
1104
Data Transfer Transport Layer
Data Transfer Physical Layer
Conventional Communication Protocol Physical Layer
1110
1106
Distributor

FIG. 11

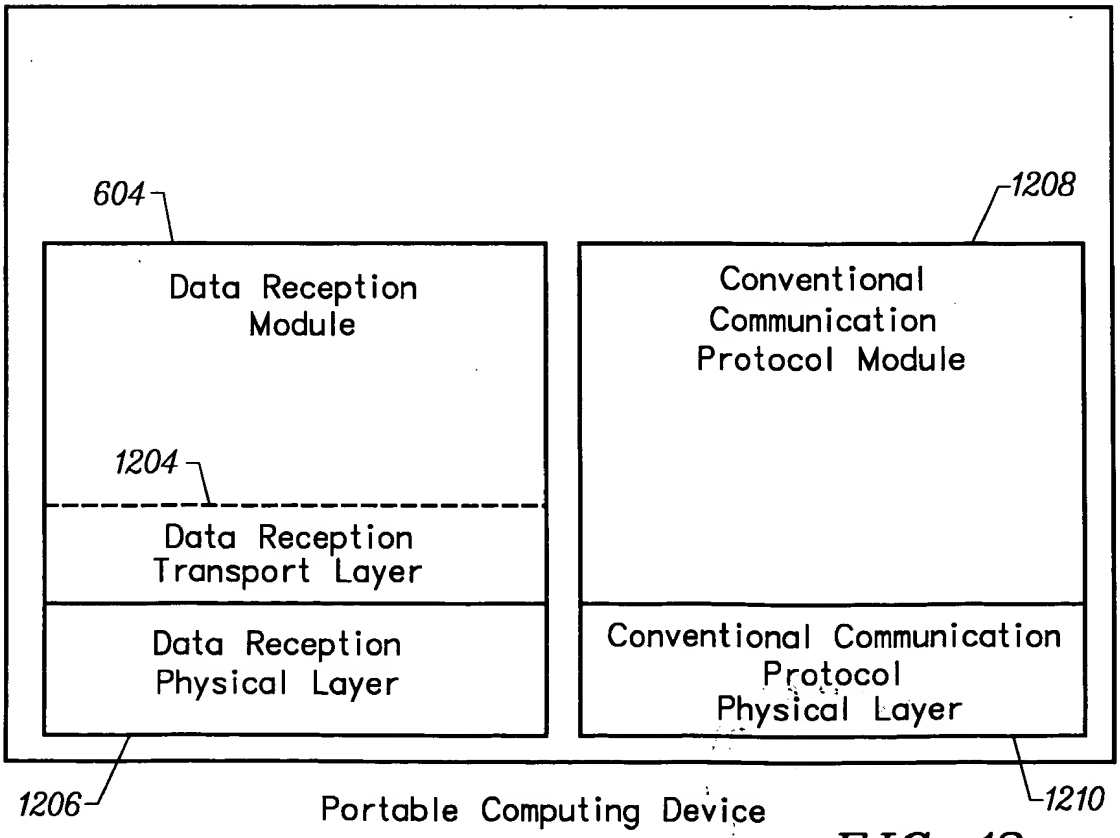
604
1208
Data Reception Module
Conventional Communication Protocol Module
1204
Data Reception Transport Layer
Data Reception Physical Layer
Conventional Communication Protocol Physical Layer
1206
1210
Portable Computing Device

FIG. 12

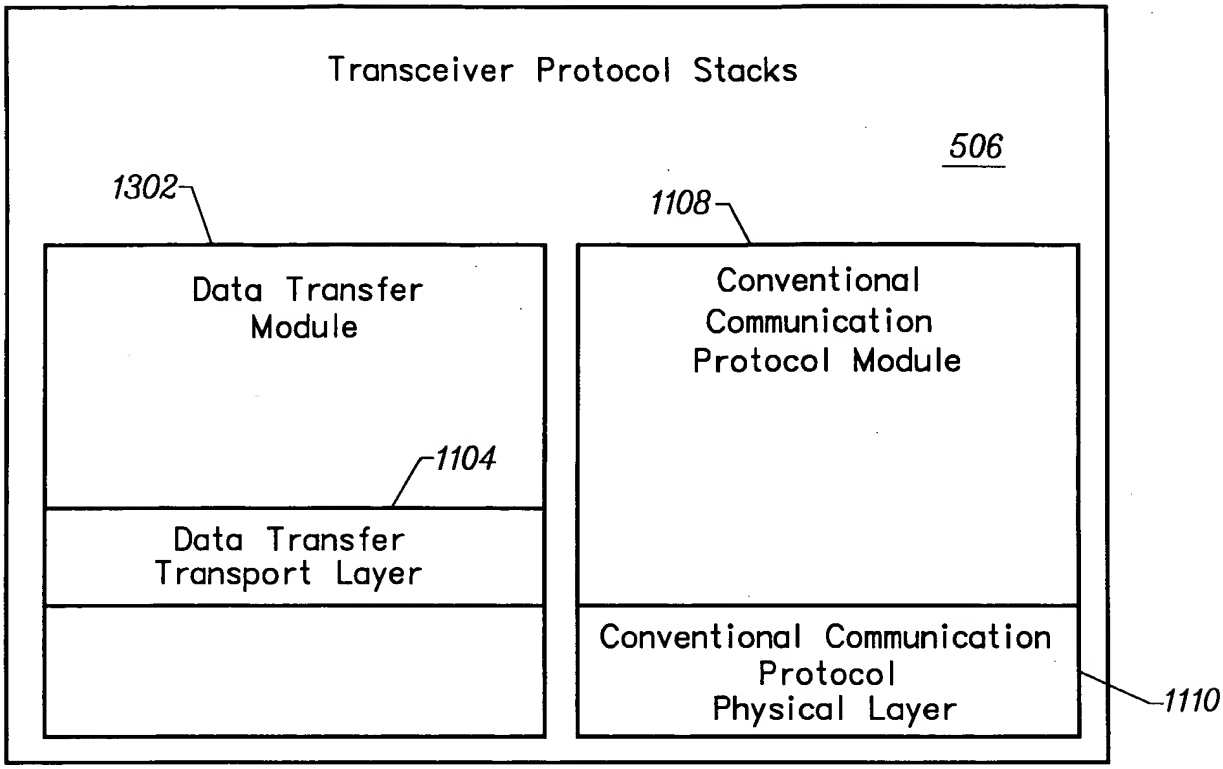
Transceiver Protocol Stacks
506
1302
1108
Data Transfer Module
1104
Data Transfer Transport Layer
Conventional Communication Protocol Module
Conventional Communication Protocol Physical Layer
1110
Distributor

FIG. 13

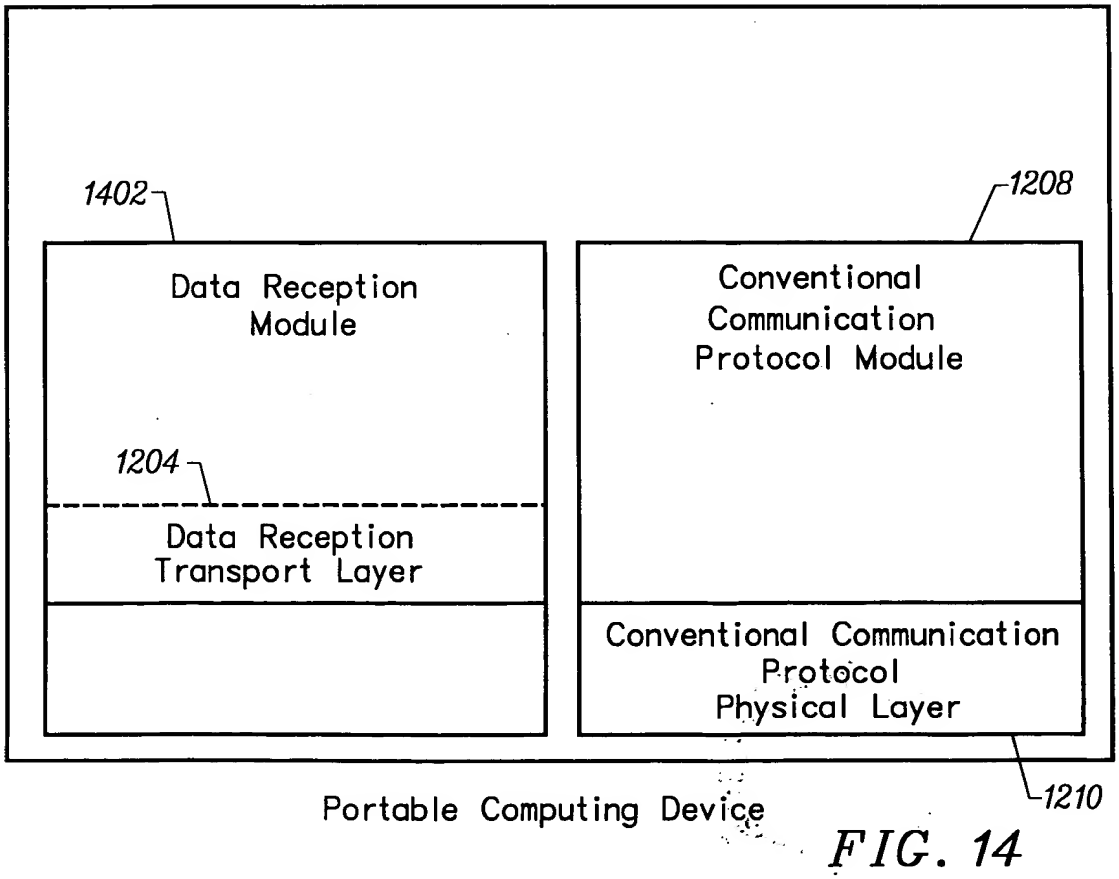
1402
1208
Data Reception Module
1204
Data Reception Transport Layer
Conventional Communication Protocol Module
Conventional Communication Protocol Physical Layer
1210
Portable Computing Device

FIG. 14

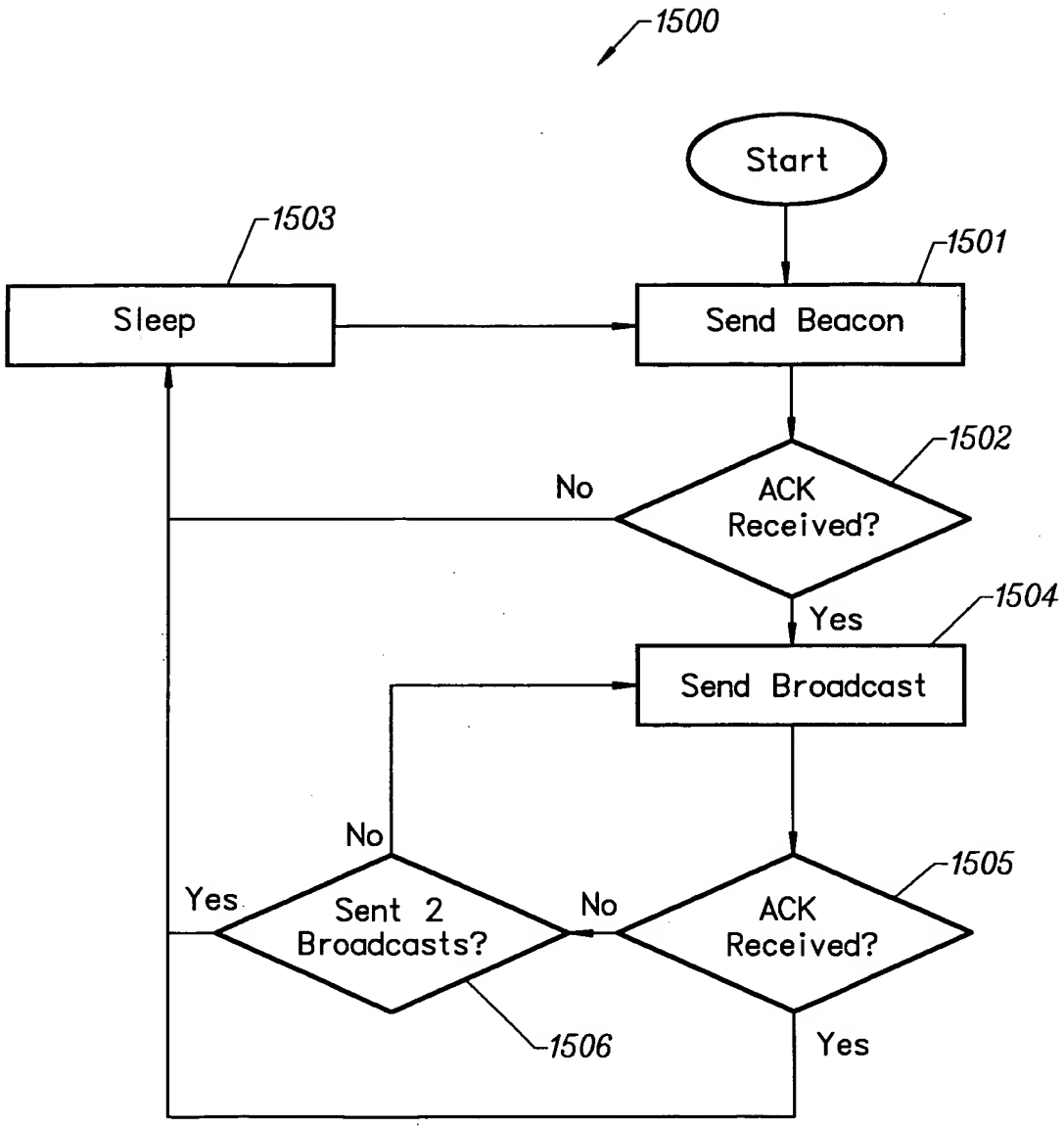
1500
Start
1501
Send Beacon
1502
ACK Received?
No
Yes
1503
Sleep
1504
Send Broadcast
1505
ACK Received?
No
Yes
1506
Sent 2 Broadcasts?
No
Yes

FIG. 15

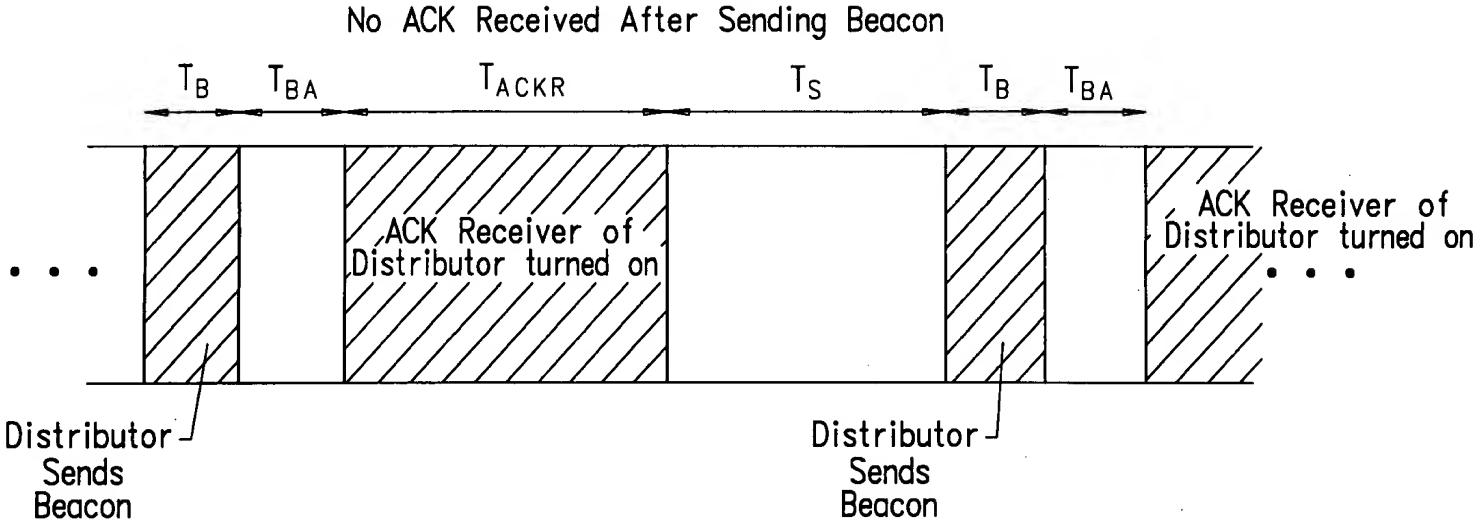
No ACK Received After Sending Beacon
T_B
T_{BA}
T_{ACKR}
T_S
T_B
T_{BA}
ACK Receiver of Distributor turned on
ACK Receiver of Distributor turned on
Distributor Sends Beacon
Distributor Sends Beacon

FIG. 16

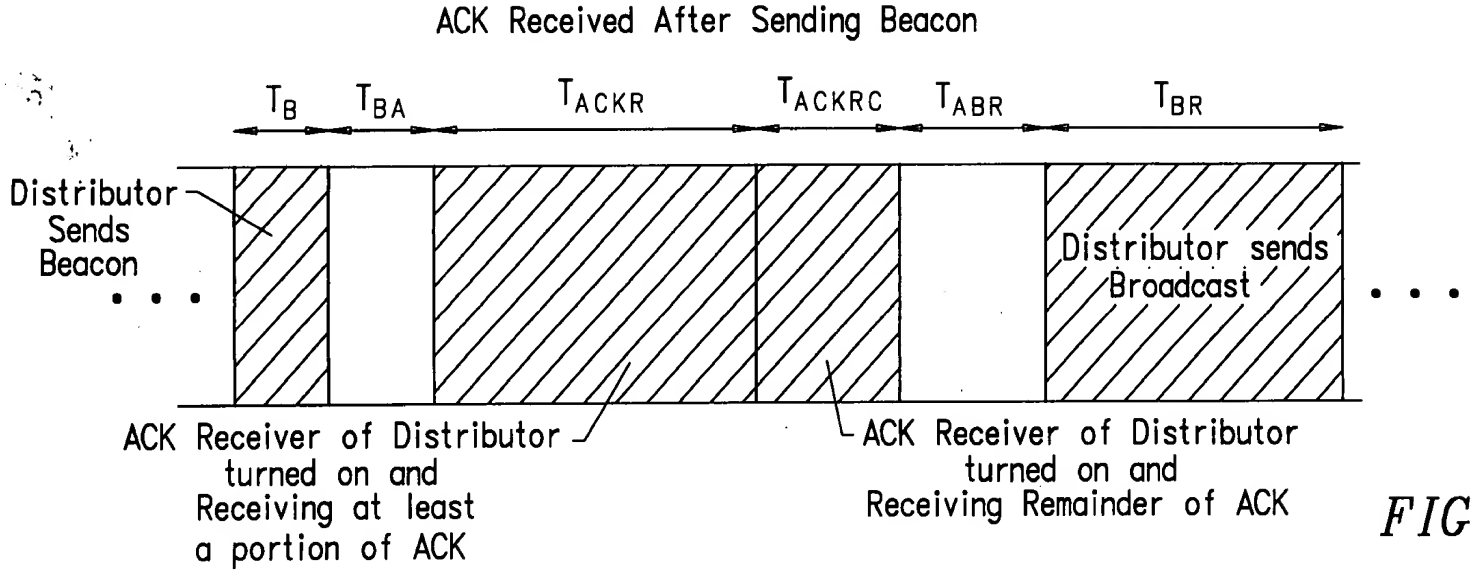
ACK Received After Sending Beacon
T_B
T_{BA}
T_{ACKR}
T_{ACKRC}
T_{ABR}
T_{BR}
Distributor Sends Beacon
Distributor sends Broadcast
ACK Receiver of Distributor turned on and Receiving at least a portion of ACK
ACK Receiver of Distributor turned on and Receiving Remainder of ACK

FIG. 17

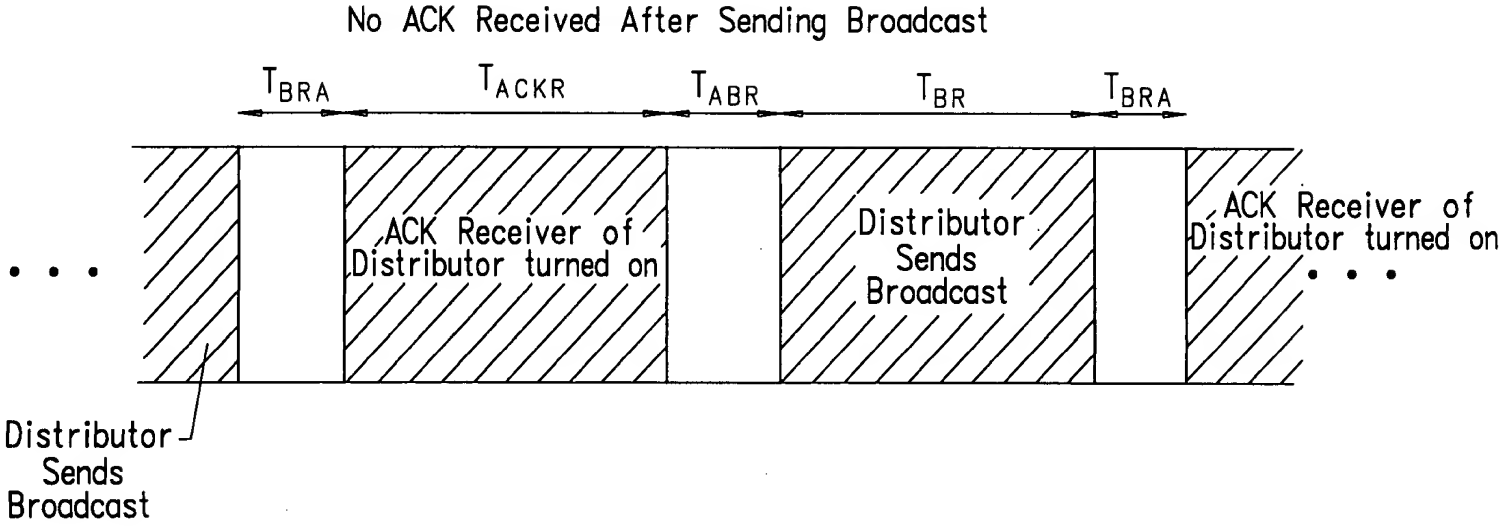
No ACK Received After Sending Broadcast
T_{BRA}
T_{ACKR}
T_{ABR}
T_{BR}
T_{BRA}
ACK Receiver of Distributor turned on
Distributor Sends Broadcast
ACK Receiver of Distributor turned on
Distributor Sends Broadcast

FIG. 18

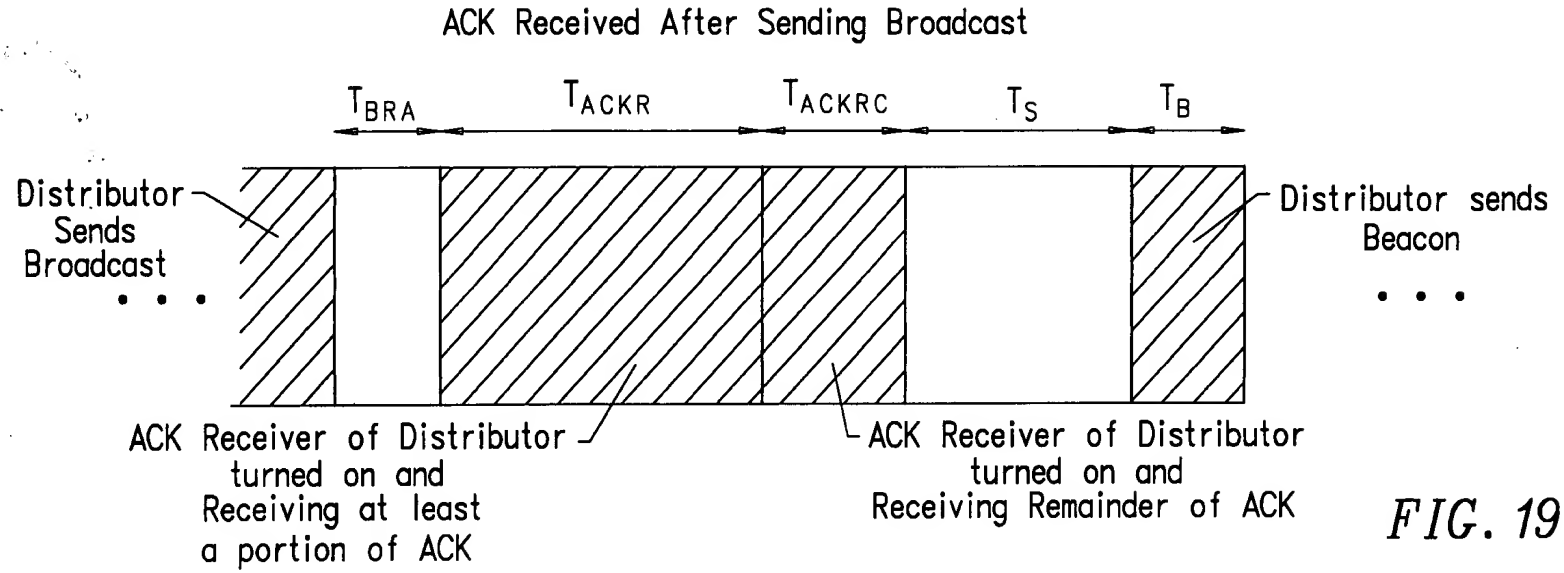
ACK Received After Sending Broadcast
T_{BRA}
T_{ACKR}
T_{ACKRC}
T_S
T_B
Distributor Sends Broadcast
Distributor sends Beacon
ACK Receiver of Distributor turned on and Receiving at least a portion of ACK
ACK Receiver of Distributor turned on and Receiving Remainder of ACK

FIG. 19

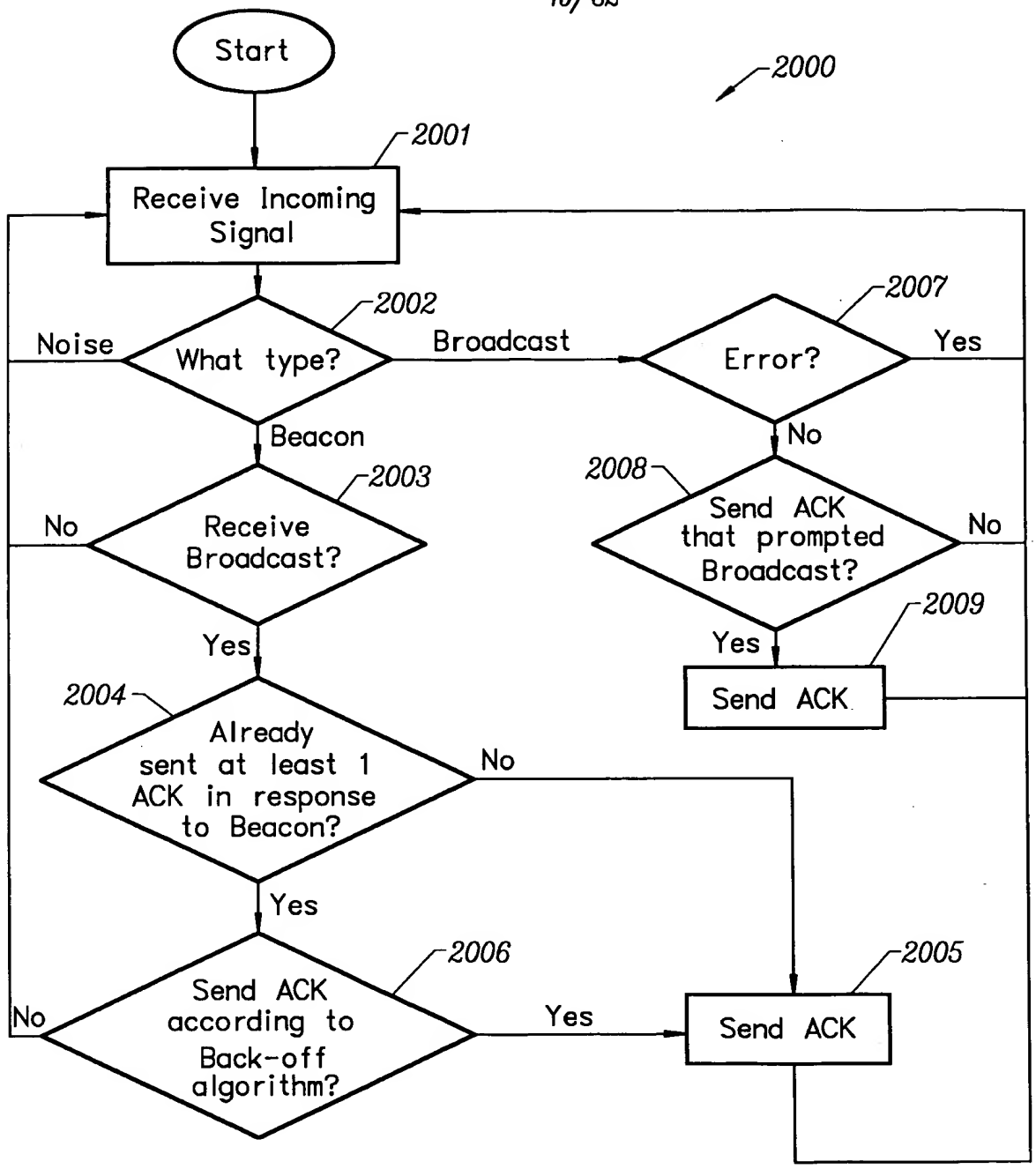
Start
2000
2001
Receive Incoming Signal
2002
What type?
Noise
Broadcast
Beacon
2007
Error?
Yes
No
2003
Receive Broadcast?
No
Yes
2008
Send ACK that prompted Broadcast?
No
Yes
2009
Send ACK
2004
Already sent at least 1 ACK in response to Beacon?
No
Yes
2006
Send ACK according to Back-off algorithm?
No
Yes
2005
Send ACK

FIG. 20

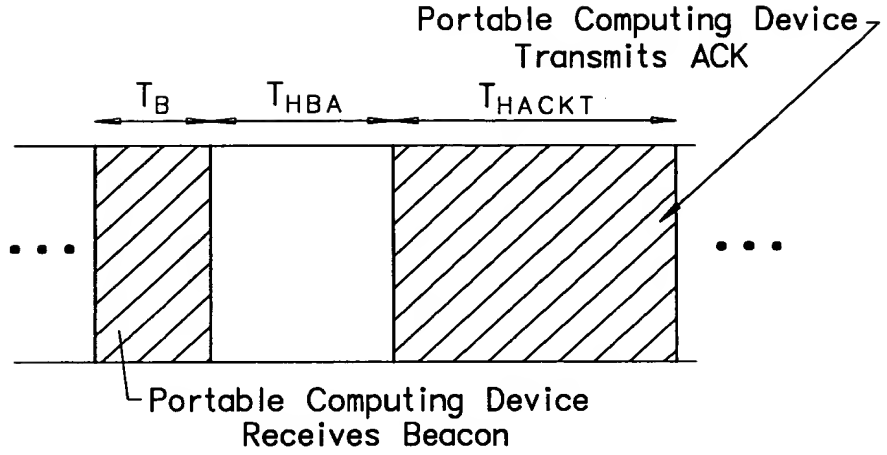

FIG. 21

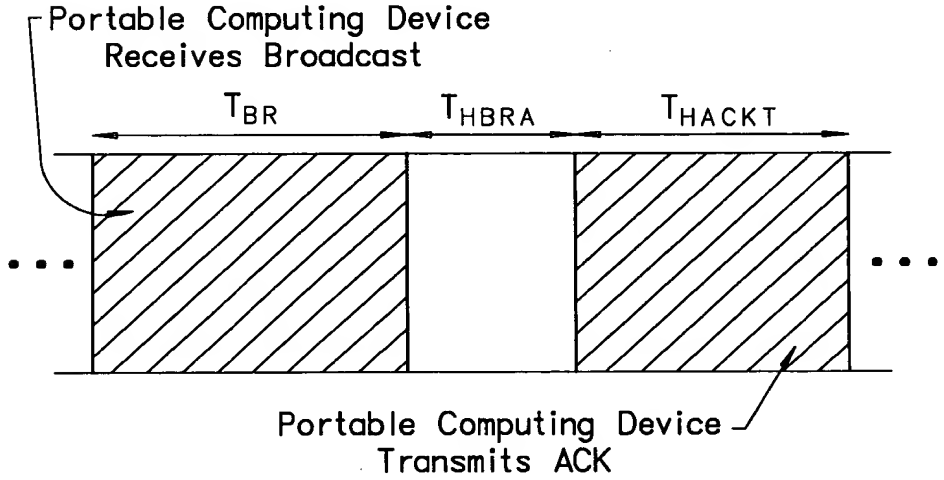

FIG. 22

Docket No. 030205

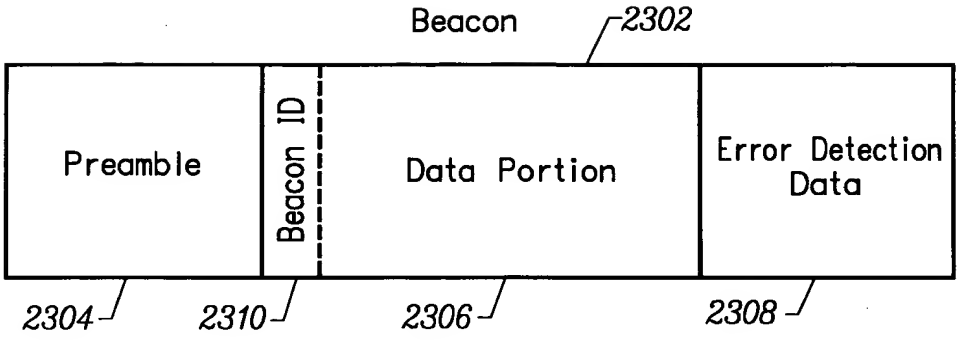
Beacon
2302
Preamble
Beacon ID
Data Portion
Error Detection Data
2304
2310
2306
2308

FIG. 23

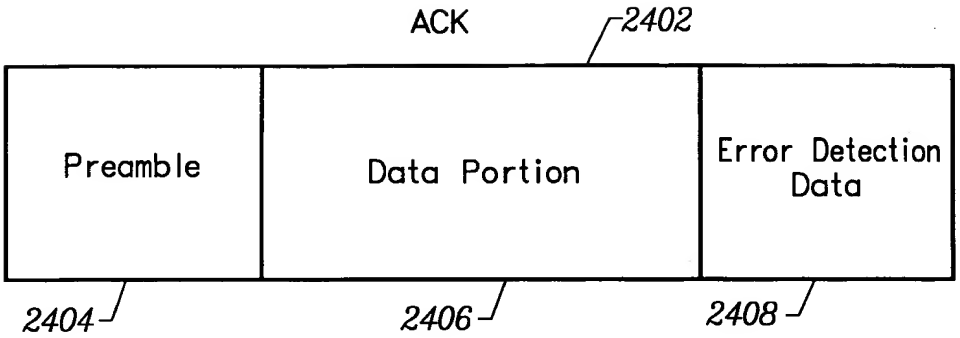

FIG. 24

FOR 2000-05-29 16:42:00.0

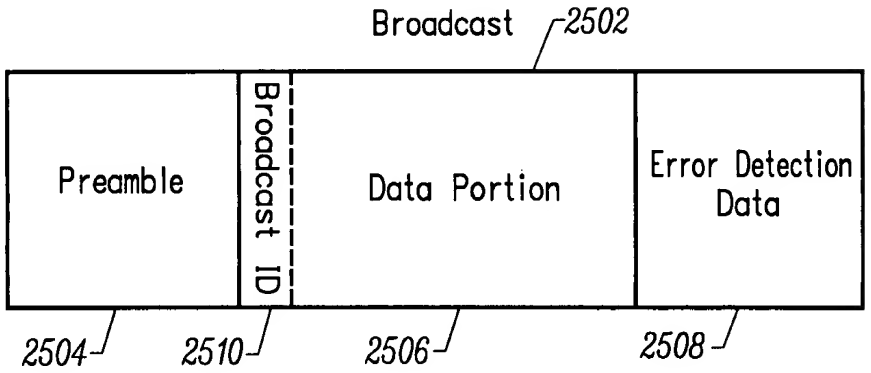

FIG. 25

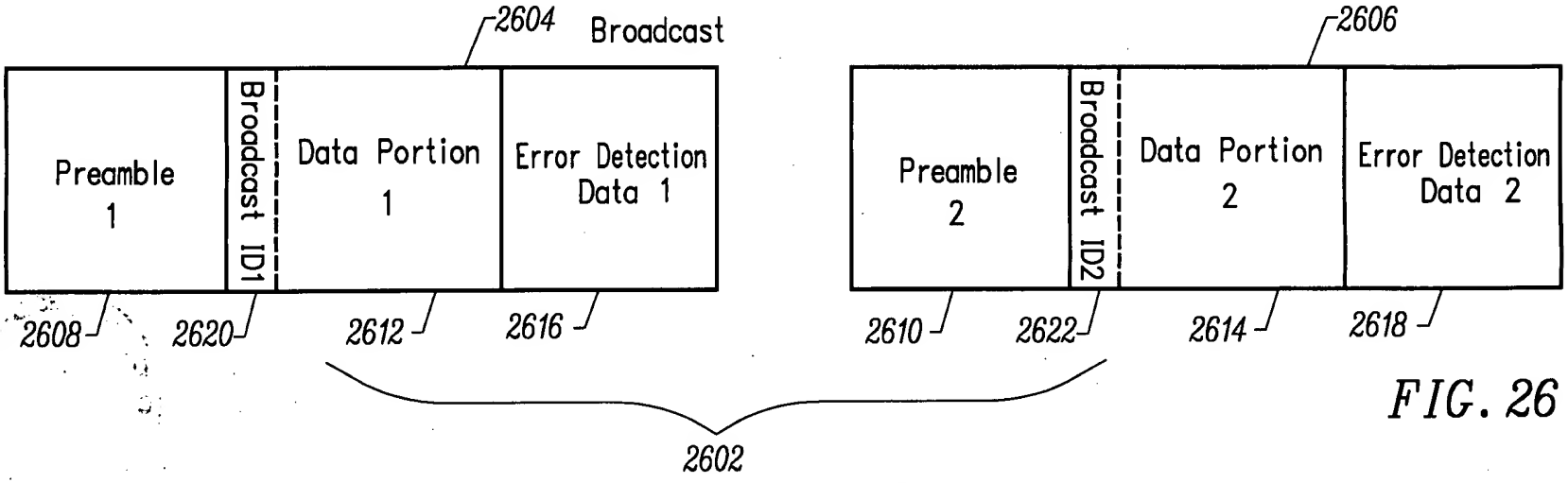

FIG. 26

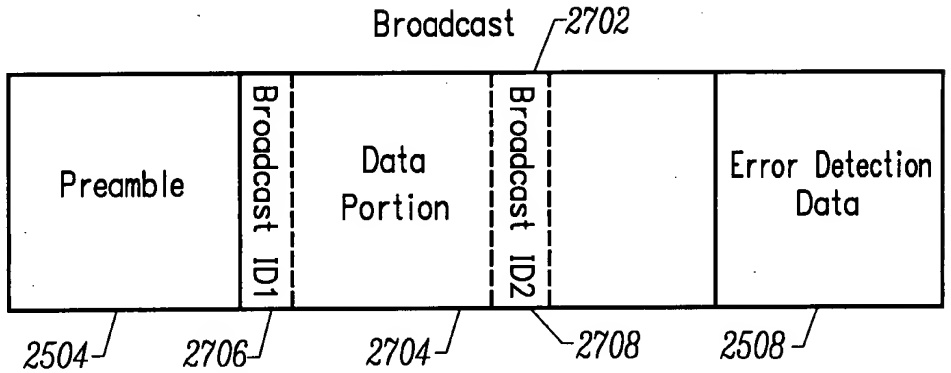

FIG. 27

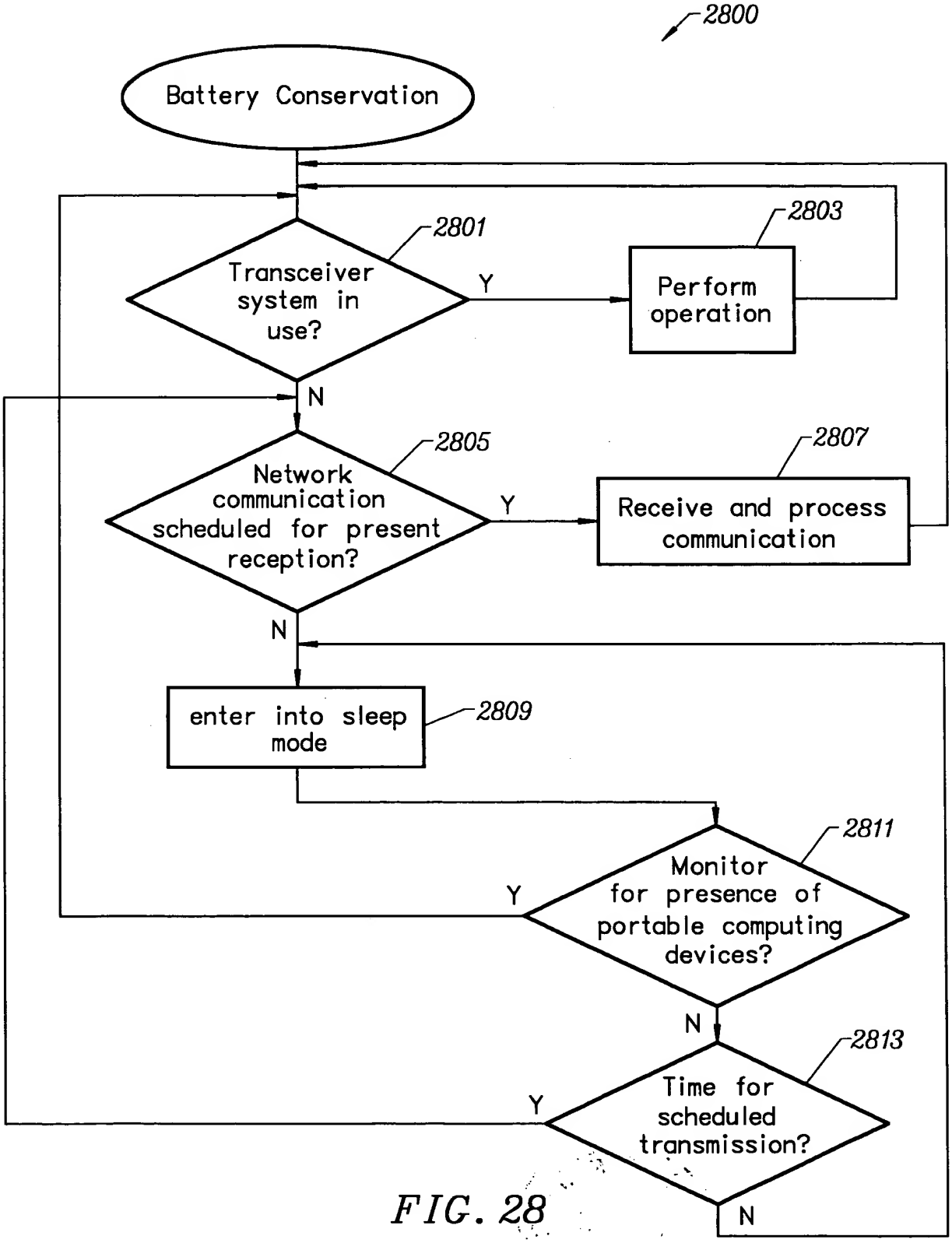
2800
Battery Conservation
2801
Transceiver system in use?
Y
2803
Perform operation
N
2805
Network communication scheduled for present reception?
Y
2807
Receive and process communication
N
enter into sleep mode
2809
2811
Monitor for presence of portable computing devices?
Y
N
2813
Time for scheduled transmission?
Y
N

FIG. 28

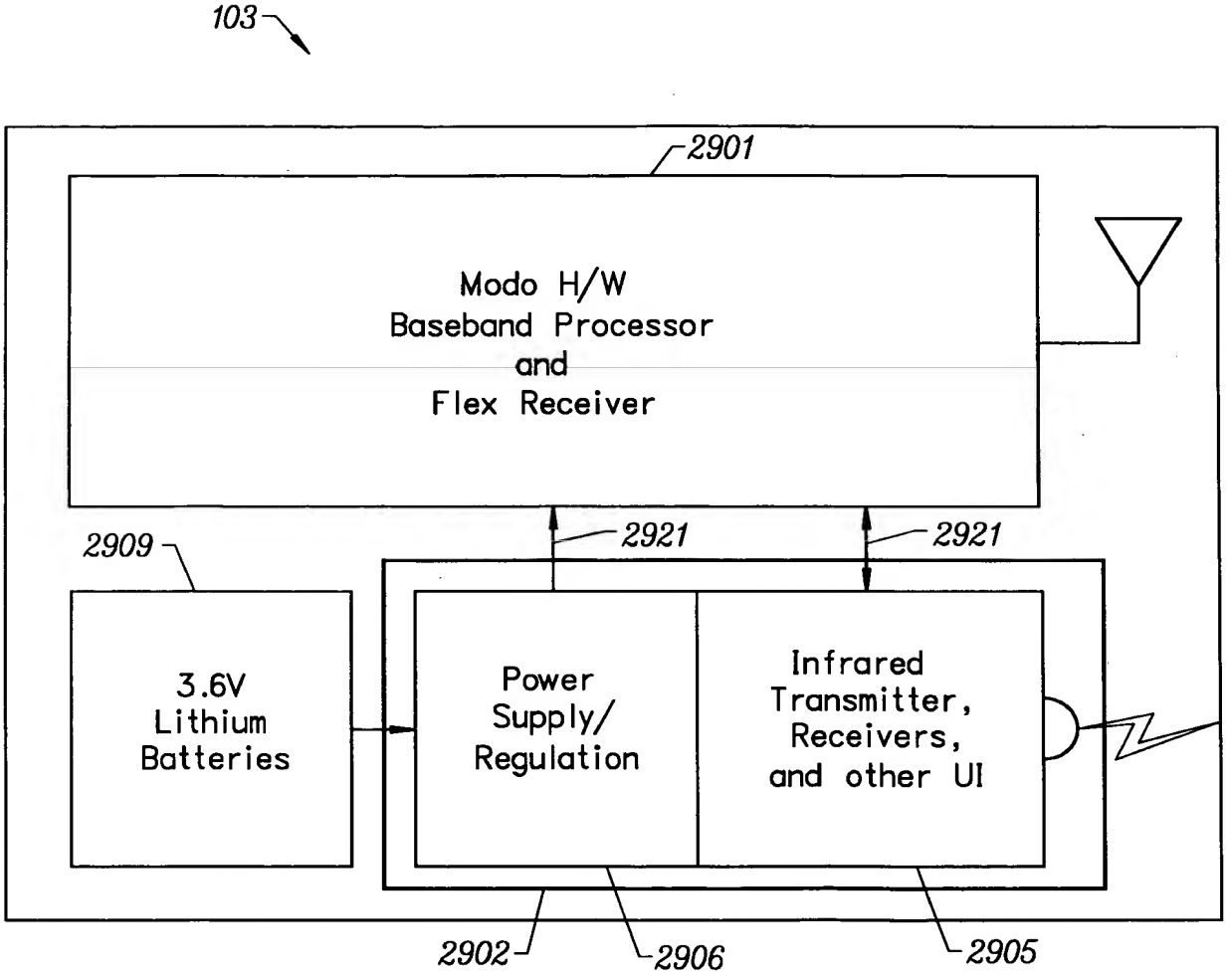
103
2901
Modo H/W
Baseband Processor
and
Flex Receiver
2921
2921
2909
3.6V
Lithium
Batteries
Power
Supply/
Regulation
Infrared
Transmitter,
Receivers,
and other UI
2902
2906
2905

FIG. 29

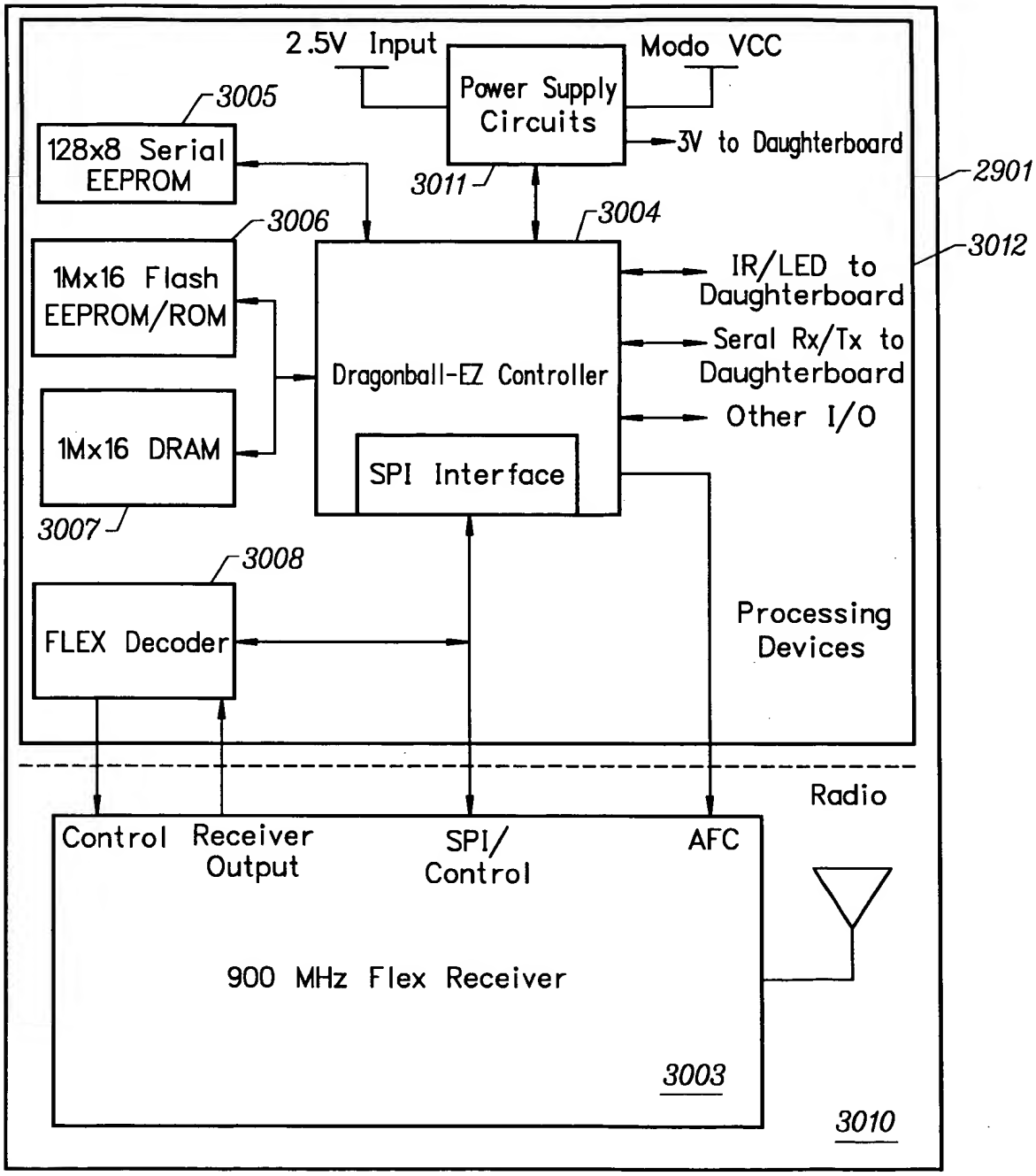
2.5V Input
Modo VCC
Power Supply Circuits
3V to Daughterboard
3005
128x8 Serial EEPROM
3011
2901
3006
3004
3012
1Mx16 Flash EEPROM/ROM
IR/LED to Daughterboard
Seral Rx/Tx to Daughterboard
Dragonball-EZ Controller
Other I/O
1Mx16 DRAM
SPI Interface
3007
3008
FLEX Decoder
Processing Devices
Radio
Control
Receiver Output
SPI/ Control
AFC
900 MHz Flex Receiver
3003
3010

FIG. 30

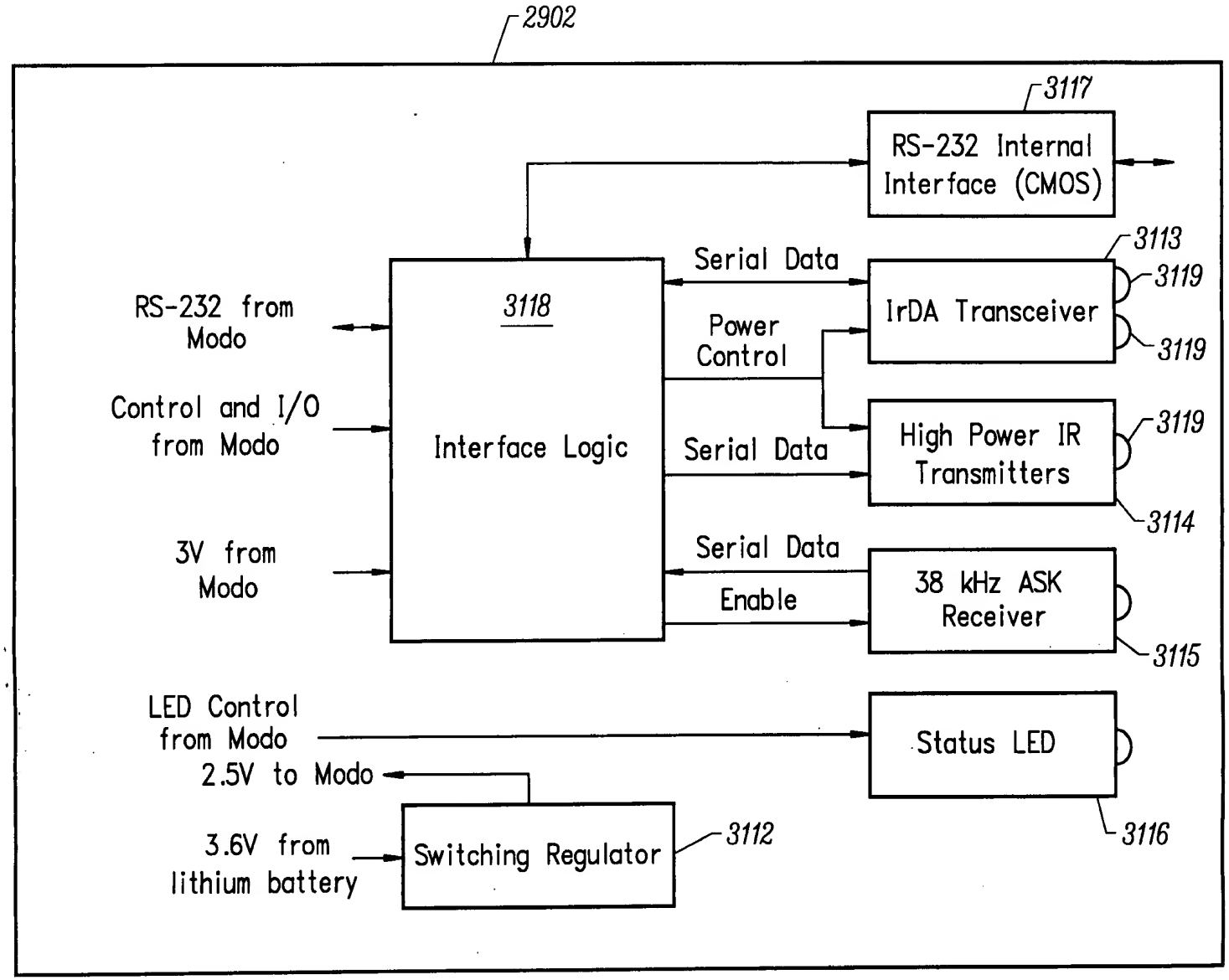
2902
3117
RS-232 Internal Interface (CMOS)
3113
3119
3119
IrDA Transceiver
Serial Data
Power Control
RS-232 from Modo
3118
Interface Logic
Control and I/O from Modo
Serial Data
High Power IR Transmitters
3119
3114
3V from Modo
Serial Data
Enable
38 kHz ASK Receiver
3115
LED Control from Modo
Status LED
3116
2.5V to Modo
3.6V from lithium battery
Switching Regulator
3112

FIG. 31.

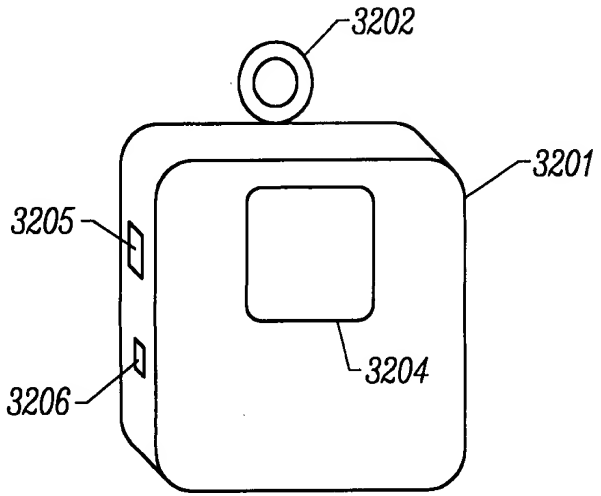

FIG. 32A

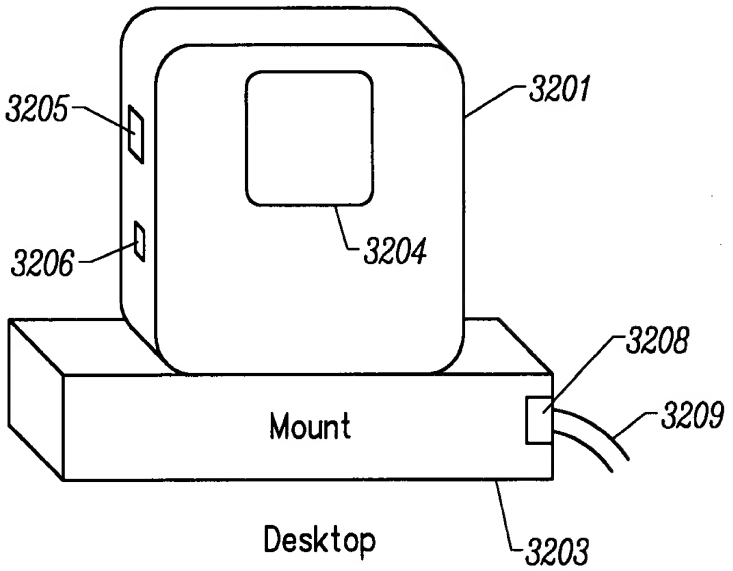

FIG. 32B

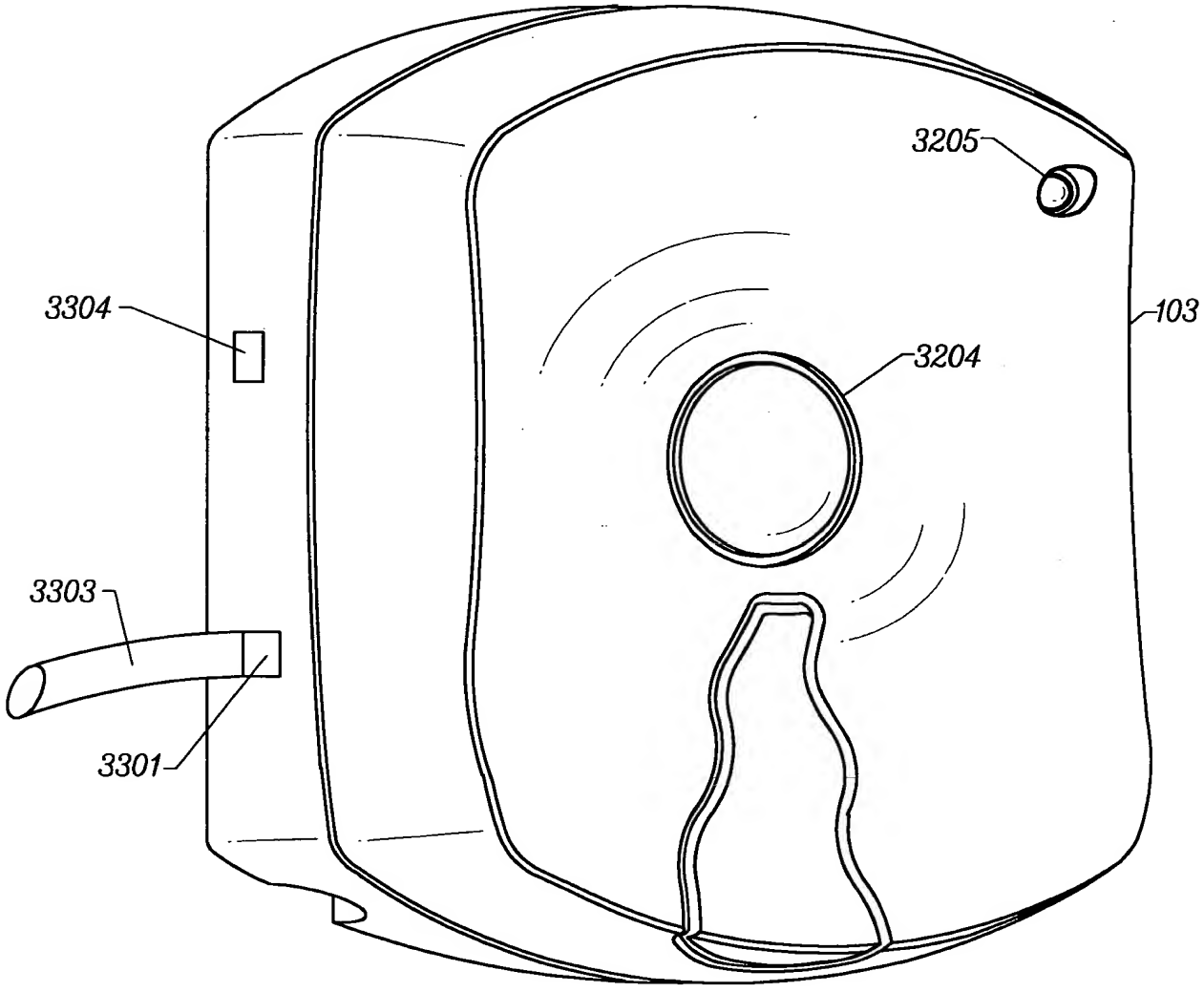

FIG. 33A

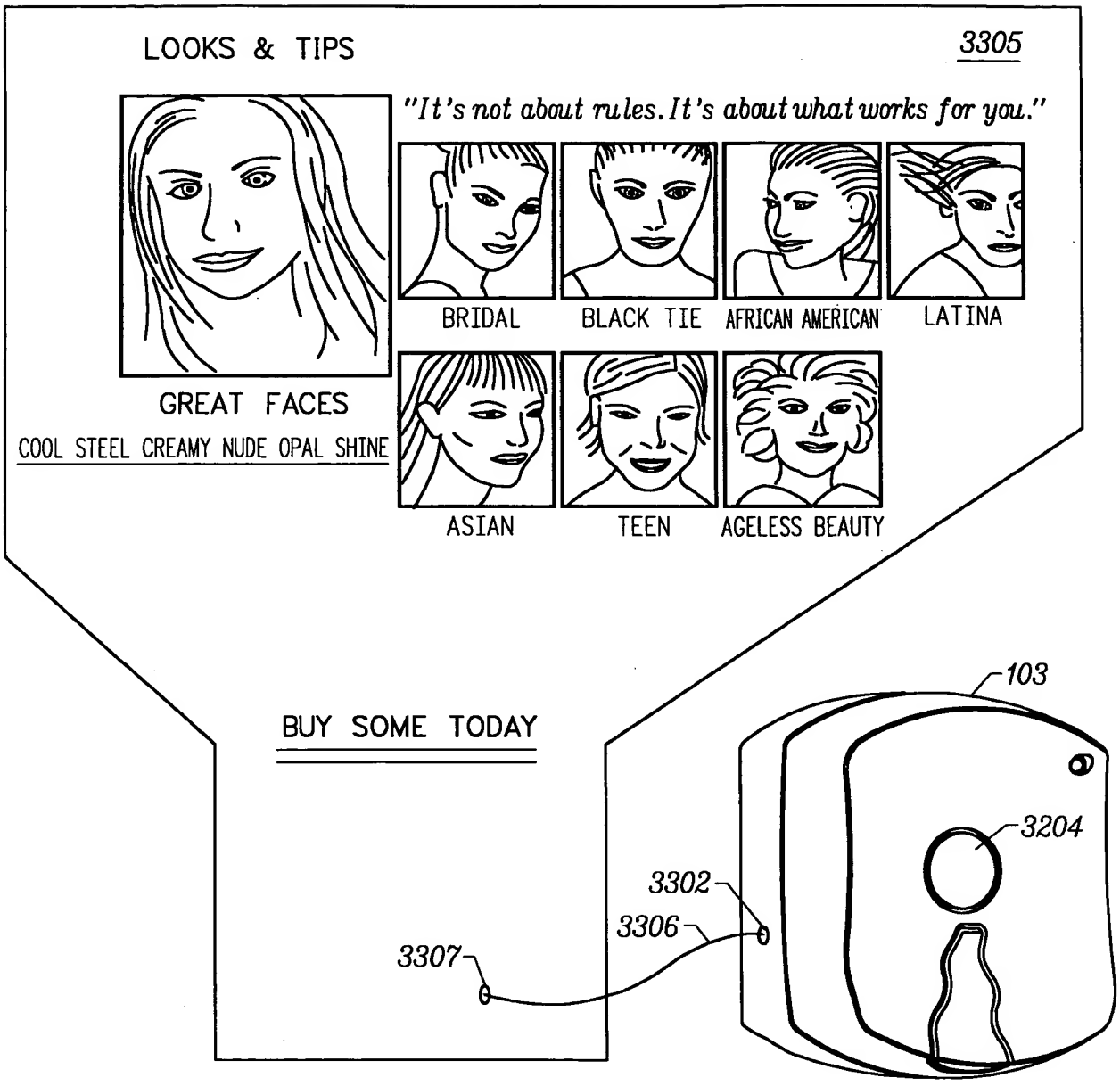

FIG. 33B

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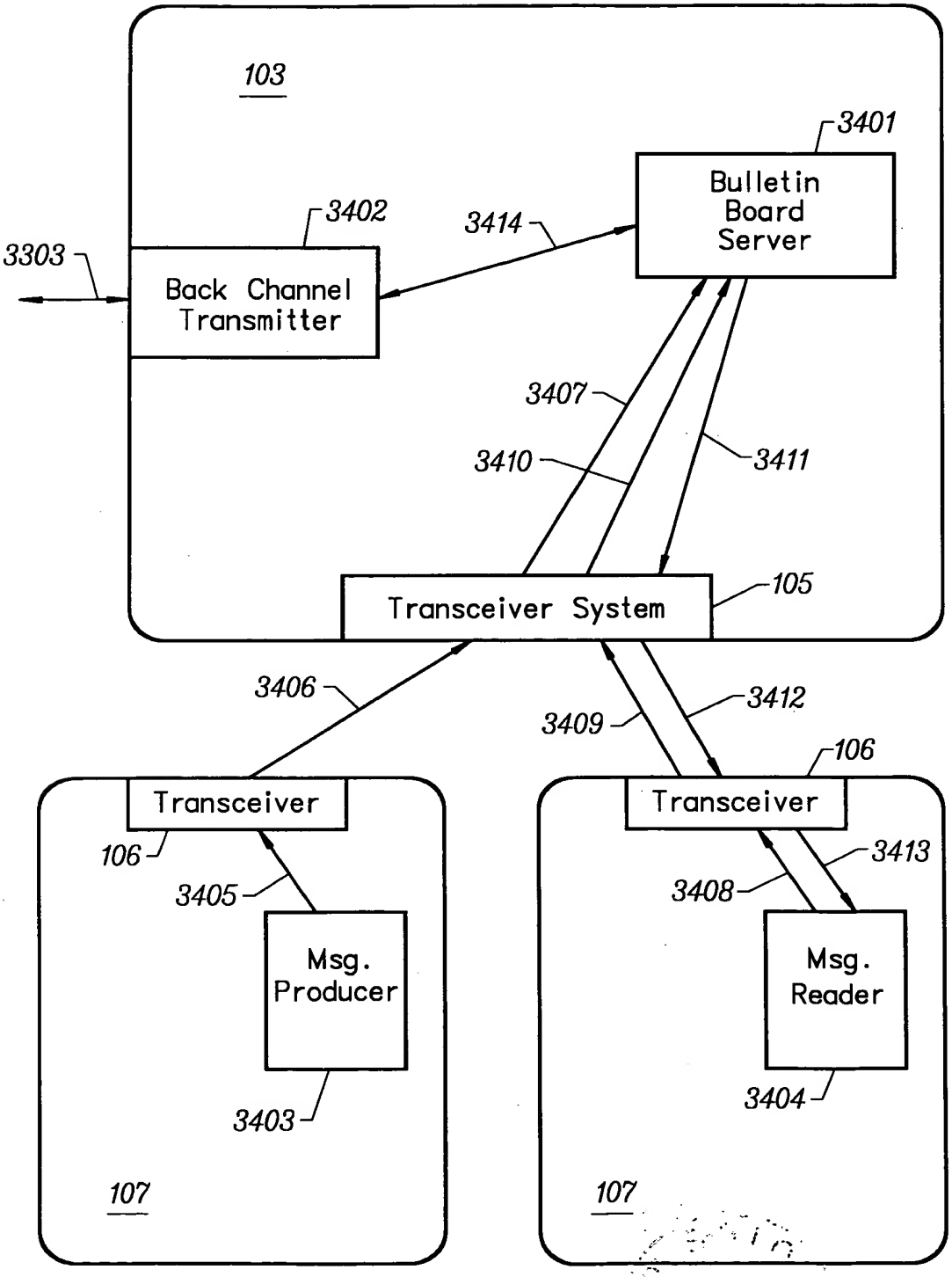
103
3401
Bulletin Board Server
3402
3414
3303
Back Channel Transmitter
3407
3410
3411
Transceiver System
105
3406
3409
3412
106
Transceiver
Transceiver
106
3405
3413
3408
Msg. Producer
Msg. Reader
3403
3404
107
107

FIG. 34

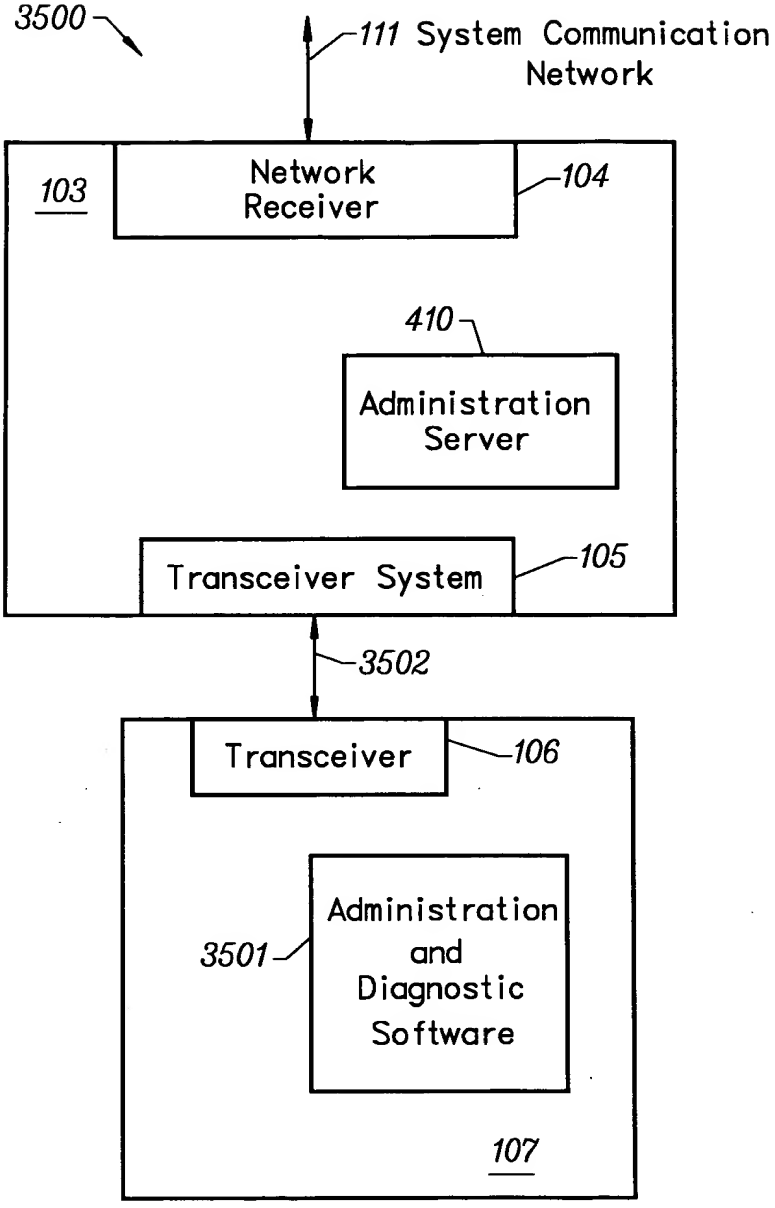
3500
111 System Communication Network
103
Network Receiver
104
410
Administration Server
Transceiver System
105
3502
Transceiver
106
3501
Administration and Diagnostic Software
107

FIG. 35